G. B. BUCKTON'S WORKS ON APHIDOIDEA (HEMIPTERA)

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SYNOPSIS

G. B. Buckton's slide collection, original drawings and notes are used to revise his published work on aphids. Of the 54 aphid species and 2 varieties he described as new, 15 are here accepted as valid, 38 are synonyms (5 newly established) and 3 are *nomina dubia*. Lectotypes have been designated for 51 species and the valid species redescribed and figured.

INTRODUCTION

Some twenty-five years after Francis Walker had laid the foundations for our knowledge of the British aphid fauna, George Bowdler Buckton published his *Monograph of the British Aphides*, which was to remain the standard work on the subject for the next forty years. Its four volumes, produced by the Ray Society in 1876, 1879, 1881 and 1883, contain descriptions of some 170 British aphids, each illustrated in colour, together with a conspectus of contemporary knowledge of the Aphidoidea as a whole. After Buckton's death in 1905 his collection of some 650 balsam mounts of aphids, together with his original drawings for the coloured plates in the monograph and a quantity of manuscript notes were acquired by the Trustees of the British Museum (Natural History). This collection comprises nearly all the material on which Buckton's descriptions of aphids were based and it is my aim here to use it as the means to revise his taxonomic work in the light of present knowledge.

Buckton was a man of varied interests who devoted most of the earlier part of his career to chemistry and physics. It was after he married and moved to Weycombe, near Haslemere, Surrey, about 1865 that he turned his energies fully to the study of natural history, and entomology in particular. (A sympathetic account of his life is given by W. F. Kirby in his obituary of Buckton (Kirby, 1907).) An injury in childhood left him permanently crippled and seriously curtailed his physical activities.

Nevertheless, it seems likely that more than half of the aphids described and figured in his monograph he collected himself in Weycombe and its immediate neighbourhood. Many more were sent to him from other parts of Britain by friends and acquaintances whose help he acknowledges in the text. Foremost among them was Francis Walker from whom he received numerous consignments of aphids as well as many of Walker's own balsam mounts. Other notable contributors included Charles Barrett, who sent aphids from East Anglia and South Wales, James Hardy, who sent others from the Cheviot Hills, Sir John Lubbock, who sent subterranean aphids from Beckenham, Kent, and Professor James Trail, who supplied several species from Aberdeen. Also mentioned in the text or in Buckton's manuscript notes are the following correspondents, with the localities from which they sent material: J. Anderson (Chichester, Sussex), Joseph Anderson (Alresford, Hants), Rev. N. Andrews (Southwater, Sussex), G. C. Bignell (Plymouth), Rev. E. N. Bloomfield (Hastings, Sussex), Mr Borrer (Cowfold, Sussex), Hon. J. T. Boscawen (Probus, Cornwall), Mr Brady (Rainham, Essex), T. Brown (Cambridge), Dr Evershed (Shere, Surrey), E. A. Fitch (Maldon, Essex), Mr Foran (Eastbourne, Sussex), Miss Henry (Lurgashall, Sussex), Mr Knaggs (Kentish Town, London), R. McLachlan (Cornwall), E. Newman (Cambridge), James Salter (Basingstoke, Hants), Miss Salvin (Hawksfold, Sussex), Alfred Smee (Carshalton, Surrey), and Frederick Walker (Abingdon, Berks). Buckton also kept up a lively correspondence with Jules Lichtenstein in Montpellier, from whom he received specimens of some two dozen species of aphids from southern France, including balsam mounts made by Lichtenstein and his friend Richter.

In compiling his monograph, Buckton's aim was to include only those aphids which he could examine and sketch while still alive. His method was first to anaesthetize an aphid, then attach its body to a spot of Canada balsam on a slide, spread and attach legs and wings to adjacent spots of balsam, and draw it in outline with the camera lucida. Then, with water-colour, he would fill in the details of its colour, markings, shadows and highlights so as to portray the insect as nearly as possible as it appeared in life. Finally he would measure the wing-span and lengths of body, antenna and siphunculus before adding more balsam and a coverglass to make a permanent preparation. (Buckton, 1876 : i-iii; 1883 : 190–193.)

All Buckton's slides are balsam mounts, the majority made by himself. His collection also included 69 slides made and labelled by Walker (now incorporated with the Walker Collection in the British Museum (Natural History)), and a few, usually with mica covers, acquired from Lichtenstein. Buckton's own slide labels are sketchy and inadequate, with date, locality and hostplant data often wanting. The paired code letters which are attached to nearly every slide are of little help in this respect and seem to relate only to Buckton's system of slide storage. In a few instances, however, where the same code letters appear on a slide and on an original drawing, they may afford some additional evidence of identification.

The sheets bearing the watercolour sketches, used as models for the 134 plates[1] of aphids in his monograph, have proved of great value in preparing this revision.

[1]The published plates total 141, of which two are of fossil aphids only, and five are of aphid parasites and predators. Originals of six aphid plates are missing.

Not only are the drawings more accurate, especially in colour characters, than the published lithographs, but the sheets also bear Buckton's own manuscript notes from which his descriptions were compiled, together with records of hostplants, localities, dates, collectors, and other data which often do not appear either on slide labels or in the monograph. Sometimes the pencilled comments, alterations and corrections which he added to these notes have also provided clues to what he was describing. Moreover, his method of working has made it possible, in many cases where data are lacking, to identify his types by comparing his sketches with the mounted aphids. Making allowance for distortion of the specimen from the addition of the coverglass and subsequent shrinkage in balsam, its attitude of body and the positions of the appendages often resemble the sketch so closely that there can be no doubt that one relates to the other. The identity of some of his types has been established by this means alone, and that of many more confirmed by such comparisons. For this reason I have been reluctant in many cases to remount aphids which I believe to be types on account of their similarity in posture to Buckton's sketches. His published measurements, however, are a less reliable check, as Buckton himself points out (1876 : i–ii), 'on account of the unequal foreshortening of the limbs, &c.' when a live insect is measured by means of the camera lucida.

Often the only precise date relating to a specimen is that on the sheet of original sketches, which seems to be the date on which he drew them and not necessarily the date of collection. A date on a slide label, when given, is usually a day or two later than that on the corresponding sketch, a result of his practice of mounting the aphids after he had finished drawing them.

Buckton's monograph represents nearly the whole of his contribution to aphidology. After its publication he described only fifteen further aphid species: eleven from material sent to him from the Indian Region (Buckton, 1889*a*, 1889*b*, 1891*a*, 1891*b*, 1893*a*, 1893*b*, 1893*c*, 1896, 1899*a*, 1899*b*), and four more from Britain (Buckton, 1886, 1901). In all he published 58 species-group names as new, 15 of which are here accepted as valid, 38 are synonyms of other species, three must be regarded as *nomina dubia*, one is a *nomen nudum* and one belongs in the Coccoidea. He also erected nine new genera (excluding those erected for fossil aphids), of which five are currently valid.

Buckton designated no types, but his slides contain specimens of nearly all the species he described, and with the help of his original drawings, manuscript notes and published data it is possible to establish most of his types with reasonable certainty.

Frederick Laing during his curatorship of the aphid collections in the British Museum (Natural History) remounted a number of Buckton's specimens, some of which he marked as types, but he published no type-designations. Theobald also examined many of them and records his opinions in his own work on British aphids (Theobald, 1926, 1927, 1929). Many more of Buckton's specimens have been removed from their original mounts, cleared and remounted in gum-chloral mixture by me for the purposes of the present work.

I have been able to designate lectotypes for all but five of the 54 species and two varieties he described as new (disregarding the coccid) as well as locating many of the specimens on which his other descriptions and figures are based. All the types of

Buckton's British aphid species are in the British Museum (Natural History), London. Of the species he described from the Indian Region, the types of *Pemphigus aedificator* and *Therioaphis maculata* are held by the Zoological Survey of India, Calcutta; and others are in London, except that of *Pyrolachnus pyri*, the location of which is unknown to me.

In the following revision, names used for the current identifications (given in bold type) of Buckton's British species conform as far as possible with those in Kloet & Hincks, *A Check List of British Insects*, 2nd Edition, Part I, 1964.

Numbers in italics refer to slides in the Buckton Collection in the British Museum (Natural History), hereafter abbreviated to BMNH.

'*W.*' preceding a slide number indicates a Walkerian slide originally in the Buckton Collection.

An asterisk (*) following a slide number indicates that the specimen(s) have been remounted.

ACKNOWLEDGEMENTS

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LIST OF BUCKTONIAN SPECIES

Those with lectotypes are marked with an asterisk (*).

1. Valid Species

**ampullata, Amphorophora*
**artemisiae, Cryptosiphum*
**aucupariae, Dysaphis* (*Pomaphis*)
**bambusae, Astegopteryx*
**carnosum, Microlophium*
**circumflexum, Aulacorthum* (*Neomyzus*)
**crithmi, Dysaphis*
**cupressi, Cinara*
**immunis, Pemphigus*
**luteum, Macrosiphum* (*Sitobion*)
**muralis, Dactynotus*
**napaeus, Pemphigus*
**pilosum, Pterocomma*
pyri, Pyrolachnus
**viciae, Megoura*

2. Synonyms

**acetosae, Aphis* = *Aphis acetosae* L.
**aedificator, Pemphigus* = *Baizongia pistaciae* (L.)
**atratus, Chermes* = *Adelges laricis* Vallot
**bellis, Aphis* = *Brachycaudus helichrysi* (Kaltenbach)
**betulae, Chaitophorus* = *Callipterinella calliptera* (Hartig)
**betulina, Thelaxes* = *Glyphina betulae* (L.)
**carnosa, Endeis* = *Geoica eragrostidis* (Passerini)
**castaneae, Callipterus* = *Myzocallis castanicola* Baker
**cucurbitae, Aphis* = *Aphis gossypii* Glover
**dilineatus, Hyalopterus* = *Longicaudus trirhodus* (Walker)
edentula, Aphis* (syn. n.**) = *Rhopalosiphum insertum* (Walker)
**fodiens, Schizoneura* = *Schizoneura ulmi* (L.)
**formicina, Endeis* = *Baizongia pistaciae* (L.)
**fuliginosa, Schizoneura* = *Schizolachnus pineti* (F.)
**fuliginosus, Lachnus* = *Tuberolachnus salignus* (Gmelin)
var. *glauca, Siphonophora rosae* = *Macrosiphum rosae* (L.)
**gracilis, Myzus* = *Metopolophium dirhodum* (Walker)
**graminis, Rhizobius* = *Aploneura lentisci* (Passerini)
instabilis, Aphis* (syn. n.**) = *Brachycaudus cardui* (L.)
lentiginis, Aphis* (syn. n.**) = *Dysaphis* (*Pomaphis*) *plantaginea* (Passerini)
**longipennis, Siphonophora* = *Metopolophium dirhodum* (Walker)
**macrocephalus, Lachnus* = *Cinara pinicola* (Kaltenbach)
**maculatus, Chaitophorus* = *Therioaphis trifolii* (Monell)
**melanocephalus, Hyalopterus* = *Hayhurstia cucubali* (Passerini)
**menthae, Siphonophora* = *Aulacorthum solani* (Kaltenbach)
**olivata, Siphonophora* = *Dactynotus cirsii* (L.)
**opima, Aphis* = *Brachycaudus cardui* (L.)
**pedicularis, Aphis* = *Aphis nasturtii* Kaltenbach
**pellucida, Endeis* = *Geoica eragrostidis* (Passerini)
penicillata, Aphis* (syn. n.**) = *Aphis grossulariae* Kaltenbach
**petasitidis, Aphis* = *Brachycaudus helichrysi* (Kaltenbach)
**pilosa, Glyphina* = *Schizolachnus pineti* (F.)
**polygoni, Siphonophora* = *Nasonovia ribisnigri* (Mosley)
*var. *rufa, Siphonophora rubi* = *Macrosiphum funestum* (Macchiati)
scrophulariae, Siphonophora* (syn. n.**) = *Cryptomyzus galeopsidis* (Kaltenbach)
**sisymbrii, Siphonophora* = *Dactynotus cichorii* (Koch)
**theaecola, Ceylonia* = *Toxoptera aurantii* (Boyer de Fonscolombe)
**viridana, Forda* = *Forda formicaria* Heyden

3. *Nomina dubia*

coccus, Pemphigus
formicophilus, Lachnus
taxi, Chermes

4. *Nomen nudum*

cinchonae, Pemphigus

5. Non-aphid

jujubae, Rhizobius: in Coccoidea, Margarodidae

LIST OF BUCKTONIAN GENERA

(Fossil aphids excluded)

Amphorophora, 1876 : 187; type-species *A. ampullata* Buckton, 1876.
Brachycolus, 1879 : 146; type-species *Aphis stellariae* Hardy, 1850.
Ceylonia, 1891*a* : 34; type-species *C. theaecola* Buckton, 1891 (= *Aphis aurantii* Boyer de Fonscolombe, 1841.)
Cryptosiphum, 1879 : 144; type-species *C. artemisiae* Buckton, 1879.
Megoura, 1876 : 188; type-species *M. viciae* Buckton, 1876.
Melanoxanthus, 1879 : 21; type-species *Aphis salicis* Linnaeus, 1758.
Oregma, 1893*b* : 87; type-species *O. bambusae* Buckton, 1893.
Pterocomma, 1879 : 142; type-species *P. pilosum* Buckton, 1879.
Ptychodes, 1881 : 39; type-species *Aphis juglandis* Goeze, 1778.

Ceylonia is a synonym of *Toxoptera* Koch, *Melanoxanthus* of *Pterocomma* Buckton, *Oregma* of *Astegopteryx* Karsch, and *Ptychodes* of *Callaphis* Walker.

BUCKTON'S APHID SPECIES

Aphis acetosae Buckton = ***Aphis acetosae*** Linnaeus

Aphis acetosae Linnaeus, 1767 : 734.
Aphis acetosae Linnaeus; Fabricius, 1775 : 739.
Aphis acetosae Buckton, 1879 : 80; pl. 62, figs 5, 6, 7. [Synonymized by Börner, 1952 : 77.]

LECTOTYPE here designated: alate viviparous female. Locality not stated. *Rumex acetosa*. 26.vi.(year ?). (*Buckton* ?). (*426a**).

Paralectotypes. 2 apterous viviparous females, 5 alate viviparous females, 6 nymphs. Data as lectotype. (*426**, *426a**, *426b**, *426c**).

Biometric data. Lectotype, alata: body length 2·30 mm, antennal flagellum 1·36 mm, ratios of segments III–VI 45 : 25 : 22 : 14 + 35, siphunculus 0·30 mm, cauda 0·16 mm, caudal hairs 15, ultimate rostral segment 0·138 mm, second segment of hind tarsus 0·138 mm, hairs on eighth tergite 7, articular diameter of antennal segment III 31μ, longest hair on ant. seg. III 12μ, on hind femur 35μ, on hind tibia 38μ, on abdominal tergite III 10μ, on abd. terg. VIII 18μ, secondary rhinaria on ant. seg. III 7 and 8.

Paralectotype, aptera: body length 2·64 mm, ant. flag. 1·27 mm, ratios of segs III–VI 37 : 23 : 21 : 14 + 32, siph. 0·39 mm, cauda 0·22 mm, caudal hairs 13, ult. rost. seg. 0·146 mm, second seg. hind tarsus 0·139 mm, hairs on eighth tergite 5, artic. diam. ant. seg. III 32μ, longest hair on ant. seg. III 12μ, on hind femur 25μ, on hind tibia 30μ, on eighth tergite 20μ.

Buckton describes this species as new and figures the apterous and alate viviparous

females and the nymph from specimens taken, according to his published account, on *Rumex acetosa*. The manuscript notes accompanying his original sketches for the figures indicate, however, that the aptera he used for figure 5 was taken on thistle, and only the nymph and alata are assigned to *Rumex acetosa*. There are no slides in the Buckton Collection named *acetosae*, but one, labelled in Buckton's hand '*A. rumicis* on Sorrel', contained the specimens listed above, all of which belong in the *Aphis acetosae* L. species-complex and include, I believe, the types of at least the alata and nymph which Buckton describes and figures. I have not found a specimen which I can identify with the sketch of the aptera said to have been taken on thistle.

Stroyan (1955 : 309 and 1957*b* : 354) discusses and compares two forms of *Aphis acetosae* L. which occur on *Rumex acetosa* and *R. acetosella* in Britain. Comparison of Buckton's material with Stroyan's shows a close similarity between both Buckton's apterae and alatae and the form associated with *R. acetosa*, which is characterized by a nearly solid black dorsal abdominal patch in apterae and transverse segmental dark bands on the abdominal dorsum in alatae. Indeed, the only considerable difference is in the lengths of the hairs on body and appendages, which in Buckton's specimens are on average about half as long as those of Stroyan's, in this respect, as also in having tibial hairs which are longer on the inner side than on the outer, resembling more closely the short haired form on *R. acetosella*.

Through the kindness of Dr Jan Pettersson of Uppsala I was also able to examine apterae of another form of *Aphis acetosae*, collected on *Rumex crispus* in Sweden by Dr F. Ossiannilsson, which showed many similarities with Buckton's specimens. In this case, however, the most obvious agreement was in the shortness of the hairs on body and appendages which came very close to those of Buckton's specimens. The aphids from *R. crispus* all had the nearly complete sclerotic tergal patch but were smaller in size than either Buckton's or Stroyan's. Buckton's sample, however, is too small to allow clear distinctions to be drawn from such comparisons and for the present I regard his species as one member of the *Aphis acetosae* L. species-complex.

Pemphigus aedificator Buckton = ***Baizongia pistaciae*** (L.)

Aphis pistaciae Linnaeus, 1767 : 737.
Aphis pistaciae Fabricius, 1775 : 739.
Baizongia pistaciae (F.) Rondani, 1848 : 35.
Pemphigus cornicularius Passerini, 1856 : 261.
Endeis formicina Buckton, 1883 : 91.
Pemphigus aedificator Buckton, 1893*a* : 71.
Pemphigella cornicularia (Passerini) Tullgren, 1909 : 171.
?Neorhizobius stramineus del Guercio, 1917 : 249.
Pemphigus pistaciae (L.) Wilson & Vickery, 1918 : 131.
Dasia aedificator (Buckton) van der Goot in Das, 1918 : 144.
[*Tycheoides setariae* (Passerini) Theobald, 1929 : 183. Misidentification.]
[*Pemphigus aedificator* Buckton; Takahashi, 1933 : 352. Misidentification.]
Baizongia oestlundi Hottes, 1949 : 86.
Baizongia pistaciae (L.) Davatchi, 1958 : 133.

Lectotype (designated by Doncaster, 1969 : 157): alate viviparous female

(fundatrigenia migrans). PAKISTAN, Quetta. *Pistacia terebinthus* (?) galls. 16.xi. 1890 (*Elliot*). (Zoological Survey of India, Calcutta, no. 7282/H7.)

Paralectotypes: 20 alate, 1 apterous viviparous females. Same data as lectotype. (Z.S.I. nos 7283–7383/H7. Slide no. 7286/H7 presented to BMNH).

I have already dealt elsewhere (Doncaster, 1969) with *aedificator* Buckton, including descriptions of lectotype and paralectotype. The name was first synonymized with *Baizongia pistaciae* (L.) by Davatchi (1958 : 133).

Amphorophora ampullata Buckton

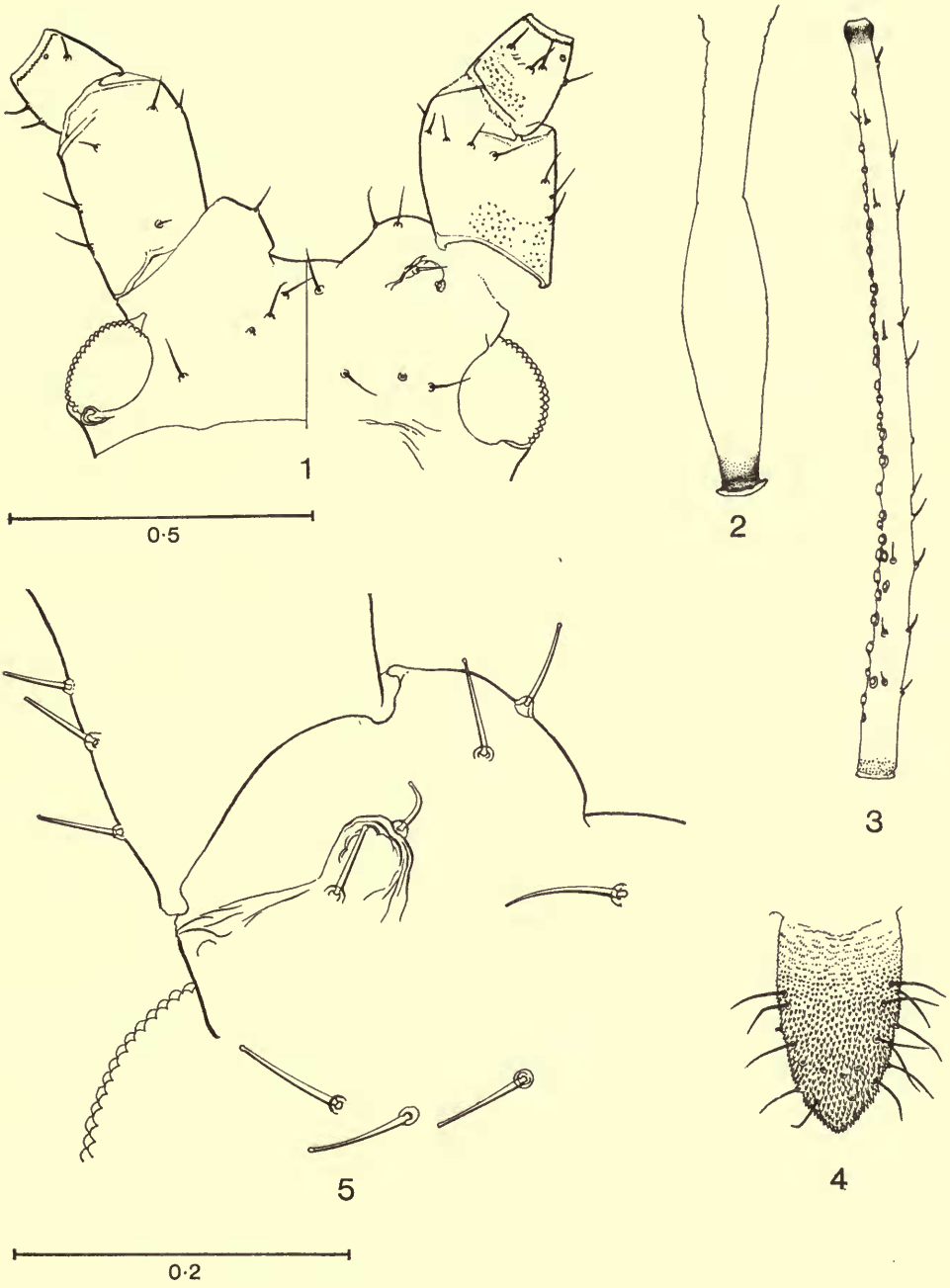
(Pl. 1, fig. 55; Text-figs 1–5)

Amphorophora ampullata Buckton, 1876 : 187; pl. 37, fig. 4.
Rhopalosiphum ampullatum (Buckton) Oestlund, 1887 : 77.
Rhopalosiphum ampullatum (Buckton); van der Goot, 1915 : 142.
Megoura dryopteridis Matsumura, 1918 : 13. [Synonymized by Miyazaki, 1968 : 14.]
Acyrthosiphon (*Amphorophora*) *ampullatum* (Buckton) Mordvilko, 1919 : 247.
Amphorophora ampullata Buckton; Mason, 1925 : 10.
Amphorophora ampullata Buckton; Theobald, 1926 : 191.
Amphorophora shidae Shinji, 1933 : 348. [Synonymized by Miyazaki, 1968 : 14.]
Amphorophora ampullata Buckton; Knechtel & Manolache, 1945 ; 484.
Amphorophora ampullata Buckton; Hille Ris Lambers, 1947 : 231.
Amphorophora dryopteridis (Matsumura) Moritsu, 1948 : 83.
Amphorophora ampullata Buckton; Börner, 1952 : 175.
Amphorophora dryopteridis (Matsumura); Paik, 1965 : 73.
Amphorophora ampullata Buckton; Hille Ris Lambers & Basu, 1966 : 14, 15.
Amphorophora ampullata Buckton; Robinson, 1966 : 1253.
Amphorophora ampullata Buckton; Miyazaki, 1968 : 14–17.
Amphorophora ampullata Buckton; Heie, 1969 : 383. [New host record.]

LECTOTYPE here designated: apterous viviparous female. Sussex, Lurgashall. *Cystopteris montana* in greenhouse. 13.ix.(year ?). (Miss *Henry*). (*37**).

Paralectotypes: 2 apterous viviparous females. Data as lectotype. (*37a**, *38**.)

Apterous viviparous female. (Plate 1, fig. 55; Text-figs 1–5). *Colour* of macerated specimen: uniformly pale yellowish, except for slight darkening at articulation of antennal segments III and IV, and IV and V; at apices of fore and middle tibiae, and apices of siphunculi. *Morphology:* body large, broadly oval, 3·28–4·05 mm long. Head smooth, dorsal hairs 52–80μ long, with blunt apices. Antennal tubercles large, diverging, each ventrally with a prominent hemispherical protuberance bearing one or two hairs. First antennal segment with 9–10 hairs, some spinules on the ventral surface near the base, and some imbrications on the inner surface near the apex. Second segment partly spinulose. Third segment spinulose at the base, remainder smooth, with from 26–39 secondary rhinaria, more or less in line, over nearly its whole length; hairs short, stout, blunt, up to 36μ long. Fourth and fifth segments faintly imbricated, sixth with processus terminalis 4·8 times as long as base (in the only specimen with a complete antenna). Rostrum scarcely reaching hind coxae, ultimate segment rather broad with straight sides tapering towards a blunt apex, 0·160–0·174 mm long, about equal in length to second segment of hind tarsus, and with 10–12 non-apical hairs. Femora and tibiae slightly scabrous apically, otherwise smooth. Femoral hairs stout, blunt, the longest reaching about 60μ. Tibial hairs more acute, more numerous, the longest about 70μ. First segments of tarsi on all legs with 3 hairs. Tergum



FIGS 1–5. *Amphorophora ampullata* Buckton. Lectotype: Fig. 1. Head, upper (left) and lower surfaces. Fig. 2. Siphunculus. Fig. 3. Third antennal segment. Fig. 4. Cauda. Paratype (*37a*): Fig. 5. Underside of left antennal tubercle to show protuberance (see text). (Figs 1–4 to same scale.)

smooth, membranous, sparsely clothed with thick blunt hairs, only about 15–20μ long on anterior tergites, longer on sixth, seventh and eighth. Eighth tergite with 6–8 hairs, the longest about 70μ. Hairs on sternites rather long (±70μ), fine, acute, rather numerous. Siphunculi smooth, except for a few apical striae below the flange, base expanded, basal two-fifths narrow, apical three-fifths evenly swollen, the diameter at the widest part about twice that at the narrowest, 2·3 times as long as the cauda and a little less than a quarter of the body length. Cauda obtuse, 1·7–2 times as long as its basal width, with 18–19 hairs. Subgenital plate with 4 hairs near anterior margin and 10–12 posteriorly.

NOTES. *Amphorophora ampullata* Buckton *sensu latiore* has been recorded from western and northern Europe, India, Korea, Japan, and North America. Its food-plants are restricted to ferns, the commonest being species of *Athyrium* and *Dryopteris* in the Old World, and of *Onoclea* in North America.

Hille Ris Lambers and Basu (1966 : 14, 15) distinguish two subspecies of *ampullata: bengalensis*, based on material from ferns in India, and *laingi* Mason, 1925, from *Onoclea sensibilis*, etc., in the U.S.A.

Cryptosiphum artemisiae Buckton

(Pl. 1, fig. 56; Text-figs 6–8)

Aphis gallarum Kaltenbach, 1856 : 236. [Homonym of *Aphis gallarum* Gmelin, 1790 : 2210.]
Aphis artemisiae Passerini, 1860 : 35. [Homonym of *Aphis artemisiae* Boyer de Fonscolombe, 1841 : 162.]
Cryptosiphum artemisiae Buckton, 1879 : 145; pl. 84, figs 1–4.
Pseudolachnus yomogi Shinji, 1922 : 730. [Synonymized by Monzen, 1929 : 48; Takahashi, 1931 : 37, Shinji, 1941 : 623.]
Cryptosiphum pseudogallarum Shinji, 1941 : 626–628. [Synonymized by Tao, 1962 : 96.]

LECTOTYPE here designated: apterous viviparous female. Norfolk, Norwich, Brandon. *Artemisia vulgaris* (galls). 2.viii.(year ?). (*Barrett*). (*42**).

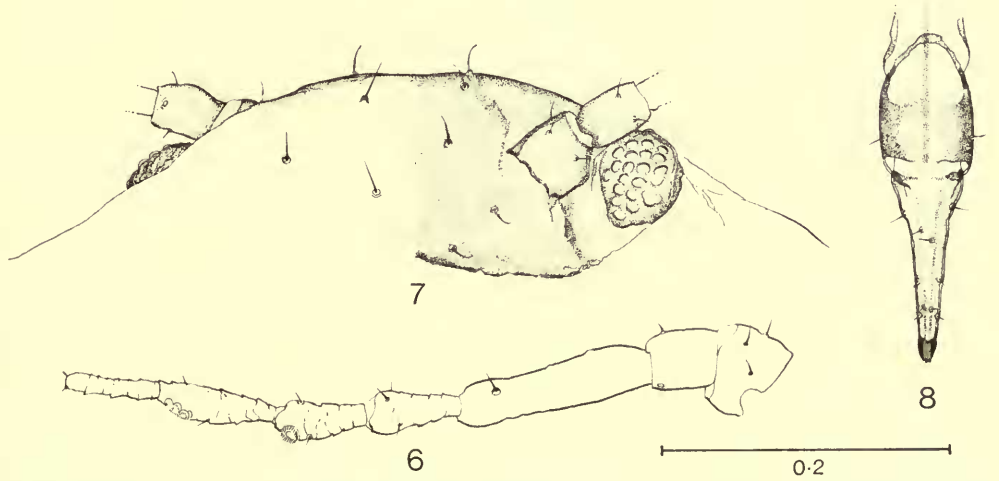
Paralectotypes: 4 apterous viviparous females, 1 nymph, 5 alate viviparous females, same data as lectotype. (*41**, *42a**, *42b**, *43**).

Apterous viviparous female. (Plate 1, fig. 56; Text-figs 6–8). *Colour* of macerated specimen: body pale brown; head, antennae, rostrum, subgenital and anal plates rather darker; legs and cauda darker still. *Morphology:* body 1·31–1·66 mm long, broadly oval, about 1·25 times as long as wide. Head short, broad, smooth, frons slightly convex, antennal tubercles absent. Compound eyes rather small, triommatidia scarcely projecting. Cephalic hairs sparse, fine, acute, from 22–32μ long. Antennae short, about 0·25 of the length of the body, of 6 segments, the length ratios of III–VI about 13 : 6 : 6 : 7 + 6. Antennal hairs sparse, acute, up to about 12μ long. Primary rhinaria, and the 5–6 accessories around that on VI, heavily fringed. Segments I–III smooth, IV–VI imbricated. Rostrum reaching to or a little beyond second coxae, ultimate segment stiletto-shaped with narrow elongate apex, 0·119–0·134 mm long, about 2·5 times as long as its basal width and from 1·2 to 1·4 times as long as hind tarsus II (0·095 mm). Two of the three normal pairs of apical rostral hairs are set at about one-sixth of its length from the apex, the third pair are displaced almost to the middle of the segment. There are 6 non-apical hairs in the lectotype, 4 or 5 in paratype apterae. Legs short; the femora, which are fused to the trochanters, stout, nearly smooth, but middle and hind femora with a few short rows of spinules on the under surface; femoral hairs sparse, fine, acute, from 20–24μ long. Tibial hairs more numerous, some on inner side stouter and spiny, the rest fine, acute, 24–32μ

long. Hind tibia about 0·2 of body length. First tarsal chaetotaxy 3, 3, 2. Tergum smooth, with few rather long (32–38μ) fine hairs. Siphunculi very small, the opening, scarcely larger than a spiracle, borne on a shallow protuberance. Cauda very short, broad, slightly convex, conforming to the oval outline of the body, with 5 or 6 hairs. Eighth tergite with 6–8 hairs 40–48μ long. Ventral hairs shorter and more numerous, sternites with irregular transverse rows of spinules. Subgenital plate transversely elongate with 5–10 hairs on anterior half and 13–16 along posterior border.

Alate viviparous female (*43**). *Colour:* body pale brown, head, thorax, antennae and legs slightly and evenly darker. Differs from aptera mainly in the narrower and slightly shorter body and relatively longer appendages. The antennae are just over half, and the hind tibiae about one-third of the body length respectively. Antennal segments III–VI are imbricated, and III bears 26–30 circular or oval, rather large secondary rhinaria with wide rims, irregularly arranged over the distal three-quarters of the segment; IV with 2–5 similar rhinaria grouped closely near its apex. Segment III joined to II by a narrow stalk, about half the diameter of the rest of the segment. Wing venation normal aphidine, but in this specimen the media in one fore wing has both its branches forked, an abnormality which Buckton records both in his original sketch of the alate *artemisiae* and in the published figure (plate 84, fig. 3).

NOTES. Buckton's sample of *Cryptosiphum artemisiae* includes one alate viviparous female of *Coloradoa artemisiae* (del Guercio), the presence of which could account for the statement in his generic diagnosis of *Cryptosiphum* (1879 : 144), 'Cauda small, but distinctly seen in the winged forms', and his doubt, expressed two pages later, whether Passerini's *artemisiae* is the same insect. The originals for his published plate include drawings of both species. The coloured drawings of aptera, nymph and alata used for figs 1, 2 and 3 are definitely based on *artemisiae* Buckton, but the end of an abdomen used for fig. 5 shows a prominent cauda and—in the original but not the reproduction—a distinct siphunculus. This, and the head, antenna and rostrum of fig. 6 would seem to have been taken from the alate *Coloradoa*. An unpublished sketch of head and antenna clearly belongs to an alate *Cryptosiphum*.



FIGS 6–8. *Cryptosiphum artemisiae* Buckton. Lectotype: Fig. 6. Left antenna. Paratype (*42a*): Fig. 7. Head, upper (left) and lower surfaces. Fig. 8. Apex of rostrum.

The sheet of originals is dated August 2nd. If, as I suspect, this is the date when Buckton drew them, the specimens must have been collected some days earlier, i.e. in late July, not 'early August' as published.

Chermes atratus Buckton = ***Adelges laricis*** Vallot

Adelges laricis Vallot, 1836 : 72.
Chermes coccineus Ratzeburg, 1843 : 202.
Chermes strobilobius Kaltenbach, 1843 : 203.
Chermes atratus Buckton, 1883 : 39; pl. 120, figs 5, 6.
(For full synonymy, see Carter, 1971 : 44.)

LECTOTYPE here designated: alate viviparous female. Surrey, Haslemere. *Quercus* sp. 2.vi.1871 (?). (*Buckton*). (*159*).

Buckton describes only the alata which he took as a vagrant on oak. There are no specimens named *atratus* in his collection, but his notes indicate that the alata was collected together with specimens of *Thelaxes dryophila*. An alate *Adelges laricis* Vallot, mounted on *159* together with apterous and alate *dryophila*, agrees reasonably well with Buckton's description, measurements and original drawing, and this I take to be his type of *atratus*.

Aphis aucupariae Buckton = ***Dysaphis (Pomaphis) aucupariae*** (Buckton)

(Pl. 2, fig. 57; Text-figs 9–13)

[*Aphis sorbi* Kaltenbach; Walker, 1850 : 276 *partim*. Misidentification.]
Aphis aucupariae Buckton, 1879 : 76; pl. 60, figs 3–5.
Anuraphis appelii Börner, 1926 : 225.
Anuraphis aucupariae (Buckton) Theobald, 1927 : 308.
Aphis (*Dentatus?*) *aucupariae* Buckton; Mordvilko, 1929 : 52.
Yezabura (*Ceruraphis*) *aucupariae* (Buckton) Börner & Schilder, 1932 : 586.
Sappaphis aucupariae (Buckton) Börner, 1952 : 97.
Sappaphis aucupariae (Buckton); Stroyan, 1957*a* : 20.
Dysaphis (*Pomaphis*) *aucupariae* (Buckton) Stroyan, 1963 : 55.
Dysaphis aucupariae (Buckton); Shaposhnikov, 1964 : 582.

LECTOTYPE here designated: apterous viviparous female (fundatrigenia). Sussex, Horsham, Cowfold. *Sorbus torminalis*. 17.vi.(year ?). (Probably *Borrer*). (*466a**).

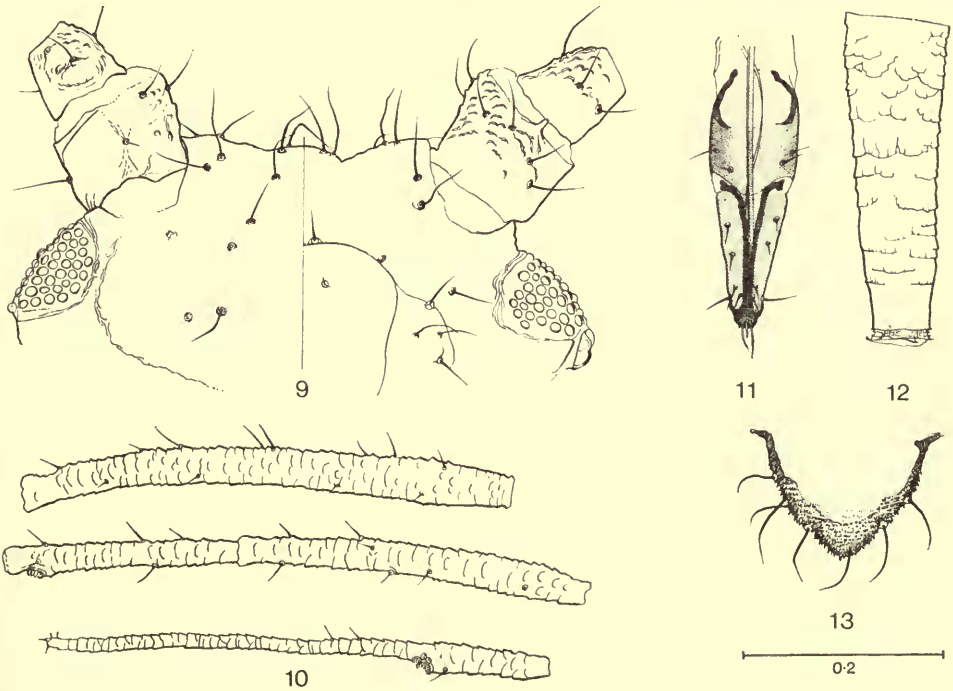
Paralectotypes: 7 nymphs, data as lectotype (*466b**, *466c**); 6 larvae, Sussex, Horsham. *Sorbus torminalis*. 18.v.(year ?). (Probably *Borrer*). (*49**, *49a**, *49b**).

Other material: 3 alate viviparous females, 4 nymphs. Middlesex, Southgate. *Sorbus torminalis*. 21.vi.1847. (*Walker*). (*W. 939*).

Apterous viviparous female (*fundatrigenia*). (Plate 2, fig. 57; Text-figs 9–13). *Colour* of macerated specimen: head, antennae except basal part of segment III, legs except femoral bases, and siphunculi dark to black sclerotic. Sclerotic bands on notum, dorsal sclerites on abdomen, anal and subgenital plates also dark. *Morphology:* body 2·47 mm long, broadly oval, about 1·4 times as long as broad. Head densely sclerotic, vertex without spinal tubercles,

wrinkled, with some scattered spinules, hairs fairly numerous, fine, acute, up to about 60μ long. Antennae with all six segments rather coarsely imbricated; hairs acute, the longest on III reaching 38μ, slightly longer than articular diameter of segment; processus terminalis 2·6 times as long as base of VI; the flagellum 1·58 mm long, about two-thirds the length of the body; ratios of segments III–VI 48 : 34 : 25 : 14 + 36. Rostrum 0·53 mm long, reaching middle coxae, ultimate segment normal, 0·148 mm long, about twice as long as its basal width, with 4 non-apical hairs, and very slightly shorter than second segment of hind tarsus (0·154 mm). Femora rough and more or less scabrous, mainly on posterior surface, hairs fairly numerous, fine, acute, up to 64μ long. Tibial hairs shorter and stouter, up to 50μ long; hind tibia about half length of body. First tarsal segments with 3, 3, 3 hairs. Abdomen with marginal tubercles on segments II–IV on left side, I–IV on right. Spinal sclerites are present as irregular broken transverse bands on segments I, VII and VIII, and as irregular paired scleroites on the intervening segments. One pair only of spinal tubercles is present on segment VIII. Dorsal abdominal hairs are acute, the longest reaching 78–80μ. Eighth tergite with 5 hairs. Siphunculi 0·33 mm long, nearly straight, slightly and evenly tapering from base to apex, imbricated, with a slight annular constriction behind the flange, each 3·3 times as long as its basal width, nearly equal in length to antennal segment IV and just over one-eighth of the body length. Cauda bluntly triangular, 0·12 mm long, about two-thirds as long as its basal width, with 7 hairs. Subgenital plate with 3 hairs on anterior half and 19 irregularly arranged along posterior margin.

Notes. From Buckton's notes and drawings I conclude that his published description of *aucupariae* is based on two samples of material, namely (a) six larvae taken probably at Cowfold, near Horsham, Sussex and dated 18th May, and (b)



Figs 9–13. *Dysaphis* (*Pomaphis*) *aucupariae* (Buckton). Lectotype: Fig. 9. Head, upper (left) and lower surfaces. Fig. 10. Left antenna. Fig. 11. Apex of rostrum. Fig. 12. Siphunculus. Fig. 13. Cauda.

one adult fundatrigenia and seven nymphs taken at Cowfold and dated 17th June. His published account confirms that both larvae and nymphs were found in the same place. Both samples are from *Sorbus torminalis;* the first (a) was originally mounted on one slide (*49*) labelled '*Aphis aucuparia*' by Buckton, but with no other data, and (b) on *466* labelled '*A. sorbi.* Cowfold.' He drew the largest of the larvae in (a) for figure 3, which he regarded as the normal apterous female and described: description and measurements as well as the sketch correspond fairly well with the specimen. The adult fundatrigenia in sample (b) was his model for figure 4, the 'globose' form, which he thought might be the fundatrix. Measurements given in his notes, but not published, support this conclusion. Since the fundatrigenia is the only adult morph in either sample, and is also complete and well preserved, I choose it as lectotype of *aucupariae* Buckton.

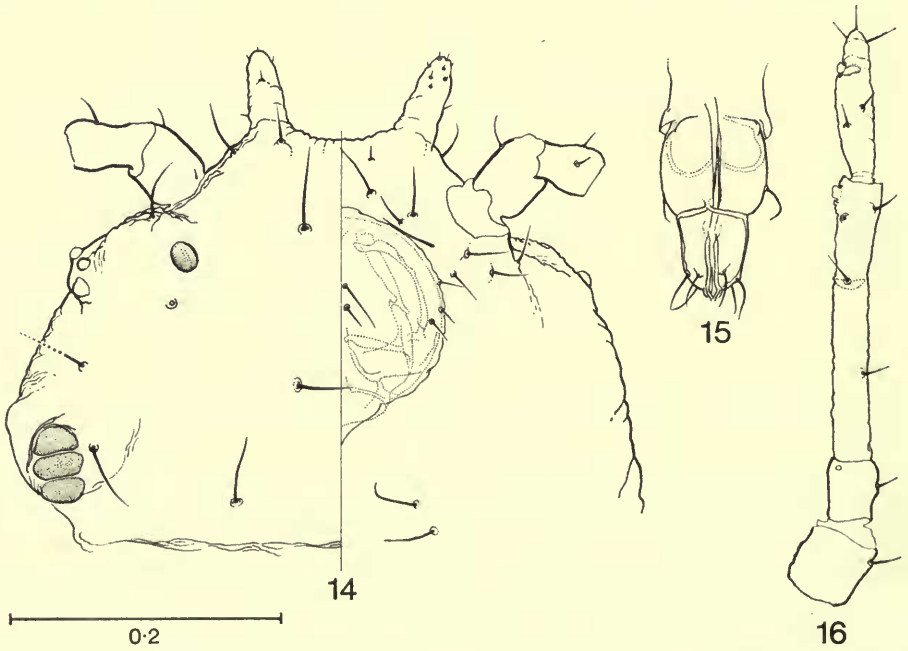
A full account of *aucupariae* (Buckton) is given by Stroyan (1957*a* : 20–22).

Oregma bambusae Buckton = ***Astegopteryx bambusae*** (Buckton)

(Pl. 2, fig. 58; Text-figs 14–16)

Oregma bambusae Buckton, 1893*b* : 87, partim.
Oregma lutescens van der Goot, 1917 : 197.
Astegopteryx bambusae (Buckton) Doncaster, 1966 : 157.

Lectotype (designated by Doncaster, 1966 : 157): apterous viviparous female.



Figs 14–16. *Astegopteryx bambusae* (Buckton). Paratype 3: Fig. 14. Head, upper (left) and lower surfaces (wax glands shown stippled). Paratype 26: Fig. 15. Rostrum. Lectotype: Fig. 16. Left antenna.

India, Uttar Pradesh, Dehra Dun. *Bambusa arundinacea.* Undated. (*Cotes*). (*53a**).

Paralectotypes: 23 apterous viv. females, 1 normal larva, 1 dimorphic larva. Data as lectotype. (*52**, *53**, *53a**, *54**, *55**, *56**, *532**). (Plate 2, fig. 58; Text-figs 14–16.)

The material on which Buckton bases *Oregma bambusae* is a mixture of two species, *Astegopteryx bambusae* (Buckton) and *Pseudoregma bambusicola* (Takahashi) (see Doncaster, 1966). All the material of true *bambusae* is in the Buckton Collection, BMNH.

Aphis bellis Buckton = ***Brachycaudus helichrysi*** (Kaltenbach)

Buckton, 1879 : 98; pl. 69 bis, figs 1, 2, 4.

LECTOTYPE here designated: apterous viviparous female. Scotland, Aberdeen. *Bellis perennis.* 18.ix.(year ?). (*Trail*). (*58*).

Paralectotypes: 2 alate viviparous females, 2 nymphs. Data as lectotype. (*58*).

Biometric data. Lectotype, apterous viviparous female: body length 1·49 mm, antennal flagellum 0·64 mm, ratios of segments III–VI 24 : 15 : 9 : 8 + 24, siphunculus 0·11 mm, cauda 0·069 mm, caudal hairs ?, ultimate rostral segment 0·104 mm, second segment of hind tarsus 0·089 mm, eighth tergite with 7 hairs, articular diameter of ant. seg. III 20μ, longest hair on ant. seg. III 10μ, on hind femur 18μ, on hind tibia 24μ, on abd. terg. VIII 80μ.

Paralectotype, alata: body length 1·84 mm, ant. flag. 0·94 mm, ratios of segs III–VI 41 : 22 : 13 : 11 + 31, secondary rhinaria on III 27, on IV 8, on V 0, siph. 0·11 mm, cauda 0·10 mm, caudal hairs 5, ult. rost. seg. 0·12 mm, second seg. hind tarsus 0·10 mm, eighth tergite with 7 hairs, artic. diam. ant. seg. III 18μ, longest hair on ant. seg. III 12μ, on hind femur 20μ, on hind tibia 26μ, on eighth tergite 45μ.

Buckton's slide is in reasonable condition and has not been remounted. Laing has marked it *helichrysi* Kalt. Theobald (1927 : 285) regarded *bellis* as a doubtful synonym of *helichrysi* and subsequent authors have confidently identified it with Kaltenbach's species.

Buckton's original sketches of *bellis* show the aptera and nymph as dull brownish yellow or brown, which is much more characteristic of *helichrysi* than the brilliant yellow or yellow-green used to colour those morphs in the plate (at least in copies I have seen). I can find nothing in the mounted aptera which might be construed as the 'vermiform parasites' shown in both Buckton's original and the published figure.

Chaitophorus betulae Buckton = ***Callipterinella calliptera*** (Hartig)

Aphis calliptera Hartig, 1841 : 369.
Chaitophorus annulatus Koch, 1854 : 7. [Synonymized by van der Goot, 1912 : 278.]
Chaitophorus betulae Buckton, 1879 : 139; pl. 82, figs 1, 2.
[*Myzocallis betulae* (Buckton); Kloet & Hincks, 1945 : 70. Misidentification.]
Calaphis callipterus (Hartig) Börner, 1952 : 58.
Procalaphis callipterus (Hartig) Quednau, 1954 : 23.
Callipterinella calliptera (Hartig) Stroyan *in* Kloet & Hincks, 1964 : 70.

LECTOTYPE here designated: ovipara. Essex, Wanstead. *Betula*. ix. (year?). ('*Wallace*': ? error for *Walker*, who collected in Wanstead). (*61**).

Paralectotypes: 4 larvae. Data as lectotype. (*62*).

BIOMETRIC DATA. Lectotype, ovipara: body length 2·48 mm, antennal flagellum 1·07 mm, ratios of segments III–VI 56 : 30 : 22 : 15 + ?, siphunculus? (incomplete), cauda? (missing), ultimate rostral segment 0·12 mm, second segment of hind tarsus 0·14 mm, eighth tergite with 12 ? hairs, articular diameter of ant. seg. III 35μ, longest hair on ant. seg. III 23μ, on hind femur 80μ, on hind tibia 100μ, on abd. terg. VIII 110μ.

Buckton describes the apterous viviparous female and the ovipara. His description and figure of the aptera seem likely to be based on the largest of the larvae on *62*. Published measurements agree reasonably well with those of this specimen; furthermore, his original sketch, though not the published lithograph, shows larva-like antennae with the third segment indistinctly, or not, divided, and an undifferentiated cauda. His manuscript notes include the comment 'probably this specimen is not quite mature . . .' His description and figure of the ovipara correspond with the ovipara on *61*, which has been remounted by Laing and marked Type. I designate this specimen as lectotype of *betulae* Buckton.

Theobald (1929 : 349–350) quotes Buckton's description and adds his own descriptions of ovipara and male; but his specimens (from *Betula alba*, Boxmoor, Herts, 23.x.1913) are sexuales of *Betulaphis quadrituberculata* (Kaltenbach).

Thelaxes betulina Buckton = ***Glyphina betulae*** (L.)

Aphis betulae Linnaeus, 1758 : 452.
Vacuna betulae Kaltenbach, 1843 : 177.
Aphis impingens Walker, 1852 : 1042.
Thelaxes betulina Buckton, 1886 : 326; pl. 6, figs 1–6.
Glyphina ? betulae (Linnaeus) Börner, 1952 : 181.
Glyphina betulae (Linnaeus); Stroyan *in* Kloet & Hincks, 1964 : 84.

LECTOTYPE here designated: apterous viviparous female. Sussex, Hastings, Guestling. *Betula*. vi. (year ?). (*Bloomfield*). (*72**).

Paralectotypes: 10 apterous, 3 alate viviparous females, 1 nymph, 1 larva. Data as lectotype. (*72**, *73*, *74*).

BIOMETRIC DATA. Lectotype, aptera: body length 1·88 mm, antennal flagellum 0·51 mm, ratios of segments III–V 33 : 12 : 16 + 4, siphuncular diameter 44μ, cauda not measurable, caudal hairs 9?, ultimate rostral segment 0·17 mm, second segment of hind tarsus 0·15 mm, eighth tergite with 5 hairs, articular diameter of ant. seg. III 30μ, longest hair on ant. seg. III 45μ, on hind femur 80μ, on hind tibia 60μ, on eighth tergite ±50μ.

Paralectotype alata: body length 1·76 mm, ant. flag. 0·58 mm, ratios segs III–V 39 : 15 : 16 + 3, secondary rhinaria on III 6, on IV 0, siph. diam. 42μ, cauda 0·085 mm, caudal hairs 6, ult. rost. seg. 0·18 mm, second seg. hind tarsus 0·14 mm, eighth tergite with 9 hairs, artic. diam. ant. seg. III 20μ, longest hair on ant. seg. III ±50μ, on hind femur ±50μ, on hind tibia ±70μ, on eighth tergite ±90μ.

Buckton describes the apterous and alate viviparous females and figures two

apterae (one 'of a later brood'), a nymph and an alata. I have not succeeded in locating the originals of these figures. (See also *Glyphina betulae*, p. 88.)

Endeis carnosa Buckton = ***Geoica eragrostidis*** (Passerini)

Tychea eragrostidis Passerini, 1860 : 39.
Tychea setariae Passerini, 1860 : 40.
[*Tychea setulosa* Passerini; Buckton, 1883 : 87. Misidentification.]
Endeis pellucida Buckton, 1883 : 91.
Endeis carnosa Buckton, 1883 : 92; pl. 129, figs 5-8.
[*Geoica utricularia* sensu auctt. nec Passerini, 1856 : 260. Misidentifications.]
[*Geoica squamosa* Hart; Theobald, 1929 : 191. Misidentification.]
Geoica discreta Börner, 1952 : 203.

LECTOTYPE here designated: apterous viviparous female. Kent, Beckenham, in ants' nest. ii.1876. (*Lubbock*). (*89**).

Biometric data. Lectotype, aptera: body length 1·78 mm, whole antenna 0·48 mm, ratios of antennal segments I–V 11 : 9 : 17 : 9 : 13, ultimate rostral segment 0·19 mm, second segment of hind tarsus 0·12 mm.

Buckton describes and figures the apterous viviparous female. The drawings of the whole insect (fig. 5) both in the lithograph and in the original are very crude, but the detail drawings of the hind end (fig. 6), and the vertex and antenna (fig. 7), relate without question to a specimen of *Geoica eragrostidis* (Passerini) received with other specimens from Lubbock. In its original mount this specimen was considerably shrunken, and the posterior abdominal segments appeared much as in Buckton's figure 6, with the rectangular anal plate protruding beyond them. In his MS notes and in his published description he interprets the anal plate as the cauda, but the caption to the figure refers to it as the ovipositor. His sketch for fig. 7 shows the flabellate hairs on the vertex, and the 5-jointed antenna in which the length ratios of the segments are about right—i.e. with III the longest—and not as he describes them as being, all 'nearly equal'.

Siphonophora carnosa Buckton = ***Microlophium carnosum*** (Buckton)

(Pl. 3, fig. 59; Text-figs 17–21)

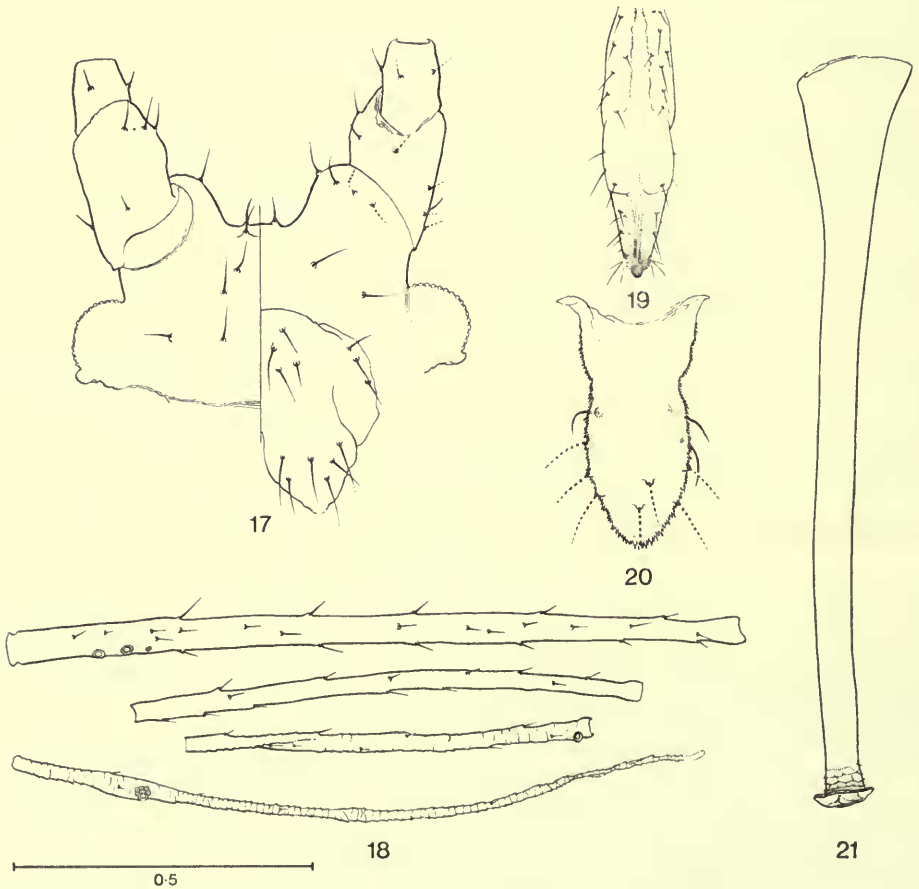
[*Aphis urticae* Linnaeus, 1758 : 453 (=*Orthezia urticae* (L.) in Coccoidea; type in Linnaean Society Collection, London); Schrank, 1801 : 106, Kaltenbach, 1843 : 13. Misidentifications.]
[*Siphonophora urticae* (sensu Schrank non L.) Koch, 1855 : 154.]
[*Siphonophora urticae* (sensu Schrank non L.); Buckton, 1876 : 143.]
Siphonophora carnosa Buckton, 1876 : 144; pl. 20, figs 1–4.
[*Macrosiphum urticae* (sensu Schrank non L.) Schouteden, 1906*a* : 241.]
[*Acyrthosiphon* (*Microlophium*) *urticae urticae* (sensu Schrank non L.) Mordvilko, 1914 : 202.]
Amphorophora evansi Theobald, 1923 : 24; 1926 : 193.
Macrosiphum schranki Theobald, 1927 : 403.
Macrosiphum carnosum (Buckton) Lindinger, 1932 : 277.
Macrosiphon carnosus (Buckton); Börner & Schilder, 1932 : 628.
Acyrthosiphon carnosum (Buckton) Hille Ris Lambers, 1933 : 171.
Acyrthosiphon (*Microlophium*) *carnosum* (Buckton) Kloet & Hincks, 1945 : 63.
Microlophium evansi (Theobald) Hille Ris Lambers, 1949 : 209, Börner, 1952 : 142, Stroyan *in* Kloet & Hincks, 1964 : 80.

LECTOTYPE here designated: apterous viviparous female. '*S. carnosa*'. Surrey, Haslemere, Weycombe. *Urtica urens* (?). 17.vi.(year ?). (*Buckton*). (*90**).

Paralectotypes: 1 apterous viviparous female, 2 late-stage larvae. Data as lectotype. (*90**).

Related material ('*urticae*'): 1 apterous, 1 alate viviparous females, 1 nymph, 1 larva. No data. (*511*); 2 alate viviparous females. 'Nettle. June. W[eycombe?].' No other data. (*512*); 1 larva. '*Urtica urens*'. No other data. (*513*); 2 apterous, 1 alate viviparous females, 1 larva. 'Nettle'. Middlesex, Southgate. 20.vii.1847. (*Walker*). (*W. 1034*).

Apterous viviparous female. (Plate 3, fig. 59; Text-figs 17–21.) *Colour* of macerated specimen: uniformly pale except for very slight darkening around antennal joints and at tibial apices.



FIGS 17–21. *Microlophium carnosum* (Buckton). Paratype (*90b*): Fig. 17. Head, upper (left) and lower surfaces. Lectotype: Fig. 18. Right antenna (segments V and VI imperfect). Fig. 19. Apex of rostrum. Fig. 20. Cauda. Fig. 21. Siphunculus.

Morphology: body 3·4–3·6 mm long, slightly more than twice as long as broad. Head smooth, antennal tubercles large, prominent, diverging, cephalic hairs long, maximally 65–75μ, acute or with spear-shaped apices. Antennal segments I–IV smooth, V slightly imbricated, VI normally so; III with 3 small circular secondary rhinaria near the base; antennal hairs sparse, blunt, up to about 50μ long. Flagellum a little longer than the body; length ratios of segments III–VI about 123 : 87 : 68 : 22 + 96(?). Rostrum scarcely reaching hind coxae, ultimate segment 0·146–0·150 mm long, equal to or slightly shorter than second segment of hind tarsus, with about 10 non-apical hairs. Femora and tibiae smooth, femoral hairs acute, up to 56μ long; tibial hairs similar, but reaching 61–65μ in length, becoming numerous towards tibial apices. First tarsal segments on all legs with 3 hairs. Tergum smooth, hairs sparse, up to 52μ long on anterior segments, reaching 65μ on eighth tergite, which bears 8–9 hairs. Siphunculi 1·25 mm long, straight, expanded at base, with pronounced apical flange, almost completely smooth, with 2–3 rows of reticulations next to the flange. Cauda 0·42–0·43 mm long, about twice as long as its basal width, slightly constricted at about one-third of its length from the base, with 9–10 hairs. Subgenital plate with 2 long and 5 shorter hairs on anterior half, and 16–18 along posterior margin.

NOTES. Buckton originally regarded *carnosa* as a variety of the large green nettle aphid known to him as *Siphonophora urticae*. In fact he distinguishes three varieties of this species, two of which, both green, he describes as Variety α and Variety β (1876 : 143) and figures on plate 19. His sheet of drawings of *carnosa* (plate 20), which show a dark, purplish grey aptera, an alata with brown body and green markings, a pink and green nymph and an almost colourless newborn larva, was at first entitled '*Siphonophora urticae* No. 2, var γ', but he altered the name to *carnosa* in the belief that it differed specifically from *urticae*. On the back of the sheet he appends descriptive notes of the four morphs he drew, and which he describes in greater detail in the text (1876 : 144, 145). The reasons he gives for separating *carnosa* from *urticae* are that '*urticae* is a larger insect, the antennae are disproportionately long, the wings are narrower, the thoracic lobes are more pronounced, and the abdomen is spotted laterally.'

The only extant specimens named *carnosa* by Buckton are two imperfect adult apterae and two larvae, remounted in balsam by Laing. Examples of the other morphs described and figured, except the newborn larva, are, however, included among specimens named *urticae*, but there is no indication of which, if any, of these were used as models for *carnosa* and not for *urticae*. One of the two alatae on *512* shows some similarities to his original for the figure of the alate *carnosa*, but there is no proof that one relates to the other.

Evidence of host plant associations is equally inconclusive. In the published text *carnosa* is recorded from 'the stinging nettle, *Urtica urens*' and *urticae* from 'the stinging nettle, *Urtica dioica*'. Though Buckton separates the two nettles by their specific names, he apples the same vernacular name to both. His manuscript notes record the hosts of *carnosa* as stinging nettle and *Rubus fruticosus*. The notes for *urticae* were destroyed when he cut out the individual drawings and remounted them in new positions on a fresh sheet. The only slide to bear a specific host identification is *513*, which contains a single larva and is marked *Urtica urens*. One other slide is marked 'nettle'; that named *carnosa* bears no data other than the name.

Hille Ris Lambers (1933 : 171), following Lindinger (1932), used the name *carnosum* Buckton to replace *urticae* Schrank (preoccupied) for the large green nettle

aphid. But later (H.R.L., 1947 : 204) he applied to this species the name *evansi* Theobald and used *carnosum* to replace *sibiricum* Mordvilko, 1914, a similar but darker and more sclerotic *Microlophium* with strongly imbricated siphunculi and a narrower cauda with fewer hairs, recorded from *Urtica dioica* and *U. urens* in Siberia but on *urens* only in the Netherlands. He acted in the belief that Buckton's dark coloured aphid described from *Urtica urens* was *sibiricum*, but he did so without having had an opportunity to examine Buckton's specimens.

The nearest approach to authenticated specimens of *carnosum* are the two adult apterae and two larvae named *carnosa* by Buckton. Though incomplete, they show most of their more important characters reasonably well, but in none can I detect any morphological difference between them and the remainder of Buckton's material named *urticae*, all of which agrees with the current concept of *Microlophium evansi* (Theobald).

The evidence, such as it is, suggests that Buckton's first surmise was correct, namely that *carnosum* is only the dark reddish or purplish colour-form of the large green nettle aphid which occurs commonly during the summer, often mixed with the typical green form. Buckton's diagnostic characters for *carnosa* (which seem to refer only to the alata, of which no named specimens exist) contain nothing to conflict with this conclusion. Furthermore, although *sibiricum* has been recorded from Western Europe, Siberia, Japan and North America, it has not, so far as I can discover, been found in Britain.

I can see no alternative, therefore, but to restore the name *carnosum* Buckton to the large green nettle aphid in place of *evansi* Theobald, and I select as lectotype the better preserved of Buckton's two adult apterae on *90*. The name of the other *Microlophium* thus reverts to *sibiricum* Mordvilko, 1914.

Callipterus castaneae Buckton = ***Myzocallis castanicola*** Baker

Callipterus castaneae Buckton, 1881 : 26; pl. 91, figs 5–9. [Homonym of *Callipterus castaneae* Fitch, 1856 : 471.]
Myzocallis castanicola Baker, 1917 : 424.
Myzocallis davidsoni Swain, 1918 : 1.
Myzocallis assimilis Börner, 1940 : 2.

LECTOTYPE here designated: ovipara. Surrey, Haslemere. *Castanea sativa*. 13.xi.(year ?). (*Buckton*). (*98*).

Paralectotypes: 5 alate viviparous females, 5 nymphs, 1 ovipara. Surrey, Haslemere. iv. (year ?). (*Buckton*). (*95, 96, 97.*)

Biometric data. Lectotype, ovipara: body length 1·88 mm, antennae incomplete, ratios of segments III–base VI 44 : 29 : 24 : 10 + ?, siphunculus 0·10 mm long, 0·07 mm wide at flange, cauda not measurable, ultimate rostral segment 0·12 mm, second segment of hind tarsus 0·14 mm, articular diameter of ant. seg. III 28μ, longest hair on ant. seg. III ±20μ, on vertex 0·15μ, on hind femur ±24μ, on hind tibia ±50μ, on tergite III ±80μ, on tergite VIII 140μ.

Paralectotype, alata: body length 1·48 mm, ant. flag. 1·32 mm, ratios of ant. segs III–VI 65 : 36 : 25 : 13 + 29, secondary rhinaria on III 6, siph. 0·09 mm long, 0·04 mm wide at apex,

cauda not measurable, caudal hairs 9, ult. rost. seg. 0·11 mm, second seg. hind tarsus 0·11 mm, artic. diam. ant. seg. III 22μ, longest hair on ant. seg. III 12μ, on vertex 30μ, on hind femur 20μ, on hind tibia 30μ, on tergite III 35μ, on tergite VIII 40μ.

Buckton describes the alate viviparous female, nymph and ovipara, and, in addition, the 'apterous viviparous female'. Apterae viviparae do not occur in this species, and what he describes is an ovipara, as is shown by his original drawing for figure 5. This according to the legend represents the apterous viviparous female, but the sketch is marked November 12 and was apparently drawn from the ovipara on *98*, dated November 13. Both original and published figure show two ova beside the specimen. Since the evidence linking specimen and figure is so strong I choose this ovipara as lectotype.

Pemphigus cinchonae Buckton: *nomen nudum.*

Pemphigus cinchonae Buckton, 1889*a* : 6.
Pemphigus cinchona Buckton; Wilson & Vickery, 1918 : 57.
Pemphigus cinchona Buckton; Patch, 1938 : 226, 348.

In an article on Indian insect pests (Rhynchota), Atkinson records having sent to Buckton for identification a sample of insects, thought to be aphids, infesting leaves of cinchona at Sikkim in August, 1888, and quotes Buckton's reply in which he assigns them tentatively to the genus *Cerataphis* but reserves his opinion on their specific status pending receipt of more material. Immediately following this record is a brief note of another aphid having been sent to Buckton, who named it provisionally *Pemphigus cinchonae*, but again deferred describing it until he could study more material. The note adds no further data.

In the Buckton Collection there is one slide (*104**), remounted and relabelled by Laing, containing specimens of an unidentified aleyrodid and bearing data which relate it to the '*Cerataphis* sp.' in Atkinson's first record. But neither specimens nor other evidence of identity have come to light which can be related to *Pemphigus cinchonae*.

Siphonophora circumflexa Buckton = ***Aulacorthum (Neomyzus) circumflexum*** (Buckton)

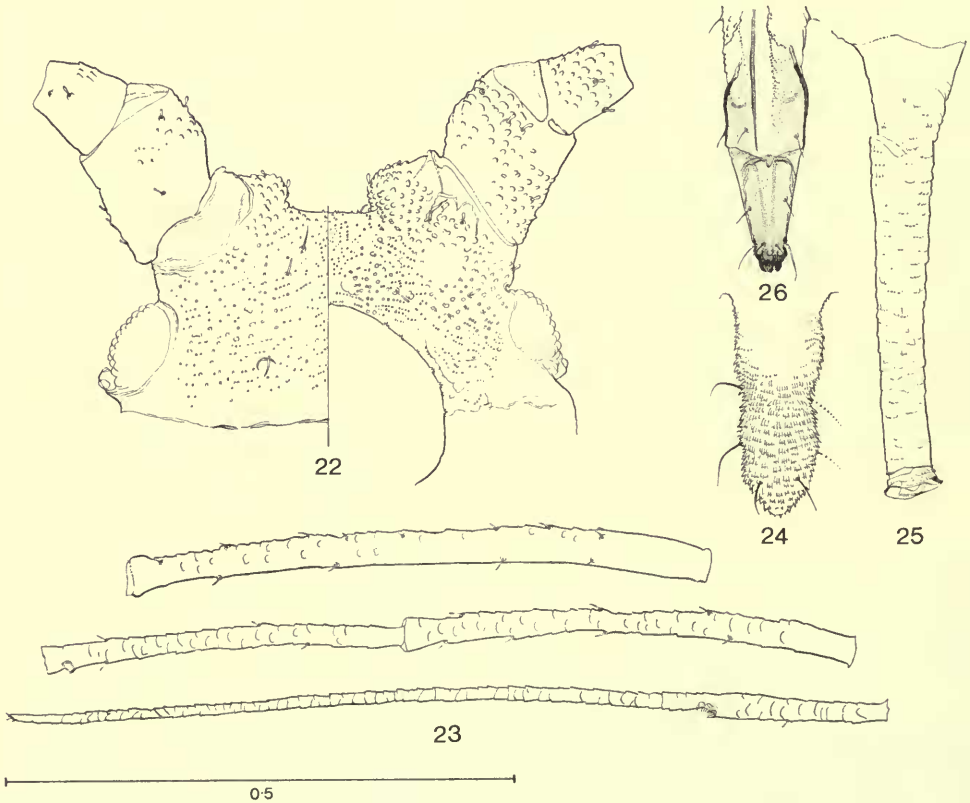
(Pl. 3, fig. 60; Text-figs 22–26)

Siphonophora circumflexa Buckton, 1876 : 130; pl. 13, figs 1–4.
Macrosiphum circumflexum (Buckton) Schouteden, 1906*a* : 238.
Myzus vincae Gillette, 1908 : 19.
Siphonophora callae Henrich, 1910 : 26.
Myzus circumflexus (Buckton) Davis, 1914*a* : 121.
Neomyzus circumflexus (Buckton) van der Goot, 1915 : vii.
Macrosiphum pelargonii var. *circumflexa* (Buckton) van der Goot, 1915 : 82.
Aulacorthum circumflexum (Buckton) Timberlake, 1924 : 457.
Amphorophora circumflexa (Buckton) Börner & Schilder, 1932 : 624.
Aulacorthum (*Neomyzus*) *circumflexum* (Buckton) Hille Ris Lambers, 1947 : 313, 1949 : 198.

LECTOTYPE here designated: apterous viviparous female. Surrey, Haslemere, Weycombe. *Sparaxis* sp. ii. (year ?). (*Buckton*). (*106c**).

Paralectotypes: 5 apterous viviparous females, 2 larvae, 1 nymph. Data as lectotype. (*105*, *106a**, *106b**, *106d**).

Apterous viviparous female. (Plate 3, fig. 60; Text-figs 22–26). *Colour* of macerated specimen: body and appendages pale except for the dorsal dark patches on either side of the median line of the thorax, the characteristic irregularly U-shaped patch on the abdomen, and a slight darkening around the articulations of the antennal segments. *Morphology:* body 1·92–2·66 mm long, oval, slightly less than twice as long as broad. Head coarsely spinulose on upper and under sides. Antennal tubercles rather short, their inner surfaces rounded and slightly protruding and bearing one or two short blunt hairs. Vertex with very few hairs, variable in length, the longest reaching 26μ, blunt or with slightly expanded apices. Antennae coarsely imbricated throughout, the imbrication being mainly confined to the ventral surfaces of all but the sixth segment. Antennal hairs very sparse, blunt or acute, the longest on III only about one-third of the articular diameter of the segment. Processus terminalis nearly four times as long as the base of VI. The flagellum very slightly longer than the body. Length ratios of segments III–VI about 57 : 44 : 39 : 18 + 72. Rostrum reaching to between second and third coxae, ultimate segment with straight sides and rounded apex and with two non-apical hairs, 0·12 mm long,



Figs 22–26. *Aulacorthum* (*Neomyzus*) *circumflexum* (Buckton). Lectotype: Fig. 22. Head, upper (left) and lower surfaces. Fig. 23. Left antenna. Fig. 24. Cauda. Fig. 25. Siphunculus (fractured). Paratype (*106a*): Fig. 26. Apex of rostrum.

about twice as long as its basal width and about 1·2 times as long as second segment of hind tarsus. Areas of spinulosity, like that on the head but less dense, occur on and around the coxae, in some specimens spreading on to the trochanters and even the bases of the femora. Legs slender, hairs short and sparse, those on the femora rather stout, blunt, up to 20μ long; tibial hairs longer, more numerous near the apex, the longest reaching 34μ. Hind tibia about two-thirds of the body length. First tarsal segments with 3, 3, 3 hairs. Tergum of abdomen sclerotic, almost smooth, with sparse, very short blunt hairs about 10μ long. Eighth tergite with 4 longer blunt hairs, the longest 22μ. Siphunculi 0·41–0·57 mm long, straight, apical two-thirds cylindrical, expanded at base, imbricated over whole length with a few apical striae and distinct flange, slightly less than a quarter of the body length, about equal to antennal segment IV, about 10 times as long as their middle diameter. Cauda 0·20–0·26 mm long, finger shaped, slightly constricted in the middle, with 3 pairs of lateral hairs, about 2·25 times as long as its basal width and half as long as the siphunculi. Subgenital plate with 2 hairs on the anterior half and 8 shorter ones along the posterior margin.

NOTES. Buckton's specimens named *circumflexa* include, in addition to those listed above, two alate viviparous females and two nymphs of *Brachycaudus helichrysi* (Kaltenbach) (*105*). Sketches of head, antenna, rostrum and siphunculi of alate *helichrysi* occur on the same sheet with the originals of *circumflexum*, but are named *cinerariae* and have not been published. The alate *circumflexum* described and figured was taken, according to Buckton's notes, in a greenhouse at Chichester in May (the notes are dated May 8). This specimen is missing from the Buckton collection.

A full account of *circumflexum* is given by Hille Ris Lambers (1949 : 198–201).

Pemphigus coccus Buckton: *nomen dubium*

Pemphigus coccus Buckton, 1889*b* : 141.
Pemphigus coccus Buckton; Ghulamullah, 1941 : 225.
Pemphigus coccus Buckton; Takahashi, 1966 : 263.

Buckton's brief and inadequate description of this species is based on immature specimens taken from dried galls on *Pistacia vera* in Afghanistan in 1885. No specimens so named or identifiable with the known data have come to light, nor any other clue to the identity of the species. Ghulamullah and Takahashi both cite the record of *coccus* Buckton but make no comment. The name must be regarded as a *nomen dubium*.

Aphis crithmi Buckton = ***Dysaphis crithmi*** (Buckton)

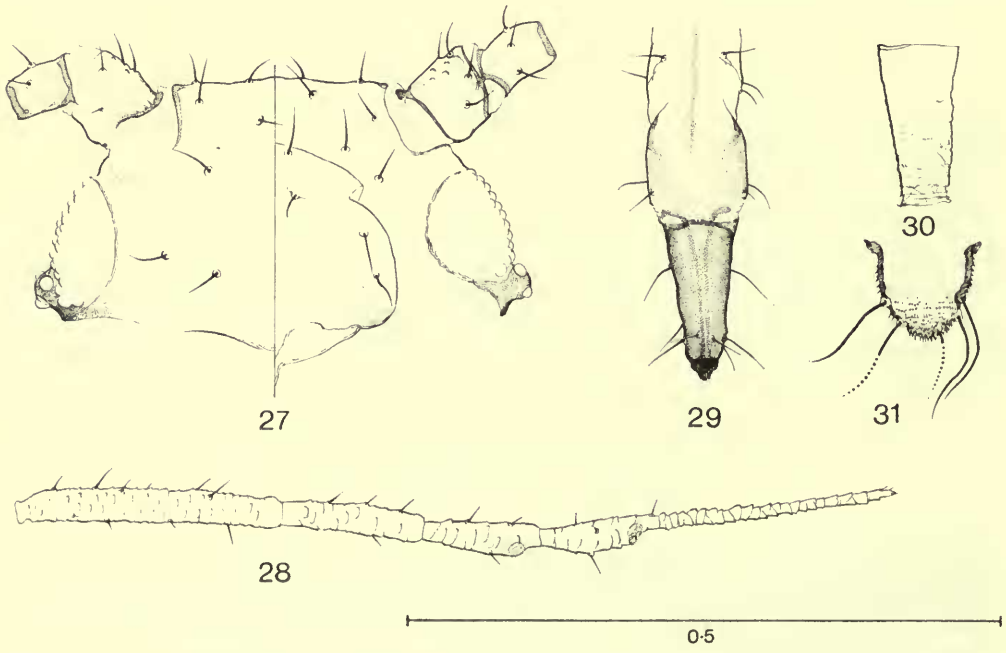
(Pl. 4, fig. 61; Text-figs 27–31)

Aphis crithmi Buckton, 1886 : 323; pl. 4, figs 1–6.
Anuraphis crithmi (Buckton) Theobald, 1927 : 405.
[*Brachycaudus helichrysi* (Kaltenbach); Hille Ris Lambers, 1934 : 32. Misidentification.]
Aphis (*Anuraphis*) *crithmi* Buckton; Balachowsky & Cairaschi, 1941 : 99.
?Yezabura crithmi (Buckton) Börner, 1952 : 229.
Dysaphis crithmi (Buckton) Stroyan, 1963 : 47.

LECTOTYPE here designated: apterous viviparous female. Devon, Kingsbridge. *Crithmum maritimum*. vii. 1886(?). (*Bignell*). (*132**).

Paralectotypes: 7 apterous, 2 alate viviparous females, 4 larvae, 3 nymphs. Data as lectotype. (*131**, *132**).

Apterous viviparous female. (Plate 4, fig. 61; Text-figs 27–31). *Colour* of macerated specimen: head, thorax and sclerotic parts of abdomen pale to mid-brown, remainder of abdomen pale to almost colourless. Antennae mid-brown, becoming darker towards apices. Fore and middle legs mid-brown, hind legs darker. Apex of rostrum, siphunculi and anal plate dark brown. *Morphology:* body 1·88 mm long, oval, not quite twice as long as broad. Head smooth, frons flat, cephalic hairs stout, spiny, up to about 36μ long. Antennae with segments I and II nearly smooth, III–VI imbricated, antennal hairs stout, blunt, the longest about equal to the articular diameter of III. Processus terminalis about 2·8 times as long as base of VI. Flagellum about two-fifths of the body length. Length ratios of segments III–VI about 24 : 12 : 10 : 7 + 21. Rostrum reaching third coxae, ultimate segment 0·14 mm long, rather narrow, elongate, about 1·25 times as long as hind tarsus II (0·11 mm), with 2 non-apical hairs. Femora rather stout, with fairly fine, acute hairs, up to 34μ long. Tibial hairs similar, becoming longer towards apex of tibia, reaching about 50μ. Hind tibia about one-third of body length. First tarsal segments with 3, 3, 2 hairs. The abdomen bears a row of paired spinal scleroites from segments I–V, a broken sclerotic transverse band on VI, and continuous transverse bands on VII and VIII. Pleural and marginal scleroites are less conspicuous than the spinals. Abdominal hairs stout, spiny, short (up to 20μ) on anterior segments, becoming longer on posterior segments, reaching 72μ on VIII. Rather small marginal tubercles present on segments I–V. Spinal tubercles absent altogether. Siphunculi short (0·134 mm), slightly shorter than apical rostral segment, about 2·75 times their middle diameter and 1·7 times as long as the cauda, slightly tapered and with a few imbrications. Cauda 0·082 mm long, about as long as its basal width, with 5 hairs.



Figs 27–31. *Dysaphis crithmi* (Buckton). Lectotype: Fig. 27. Head, upper (left) and lower surfaces. Fig. 28. Right antenna. Fig. 29. Apex of rostrum. Fig. 30. Siphunculus. Fig. 31. Cauda.

NOTES. There were originally two slides made by Buckton of *crithmi*, both of them in very poor condition with the balsam emulsified and the specimens obscured. Both bore the data '*Aphis crithmi*. Samphire.' and one also included the date (July) and 'Plymouth'. In his published description Buckton records *crithmi* from *Crithmum maritimum* at Kingsbridge, Devon, and adds that specimens were sent him by G. C. Bignell, who lived at Plymouth. Apart from the omission of date and locality from one of the labels, Buckton's two slides were so similar in all other respects that I regard the specimens they contained as having all belonged to the same sample.

Theobald (1927 : 405) records having examined one of Buckton's slides of *crithmi* (that containing two alatae, now *131**), but found the specimens so heavily obscured that he could make little of them beyond concluding that they agreed with his concept of *Anuraphis*. Laing had marked both slides '? *helichrysi* Kaltenbach' and noted that they should be remounted, but he never did so. Even after remounting into gum-chloral many of the specimens still suffer from shrivelled or collapsed appendages.

Hille Ris Lambers (1934 : 32) places *crithmi* Buckton as synonym of *Brachycaudus helichrysi* (Kaltenbach). At that time, when Buckton's two slides would have been in their original state and the specimens scarcely visible, Laing's tentative identification of them as *helichrysi* would have seemed reasonable enough.

Neither the original drawings for Buckton's plate of *crithmi* nor any manuscript notes relating to it have so far come to light.

Stroyan deals fully with *crithmi* in his revision of the British species of *Dysaphis* (Stroyan, 1963 : 47–48).

Aphis cucurbitae Buckton = ***Aphis gossypii*** Glover

Buckton, 1879 : 56; pl. 54, figs 1, 2.

LECTOTYPE here designated: alate viviparous female. Surrey, Carshalton. *Cucumis melo*. 26.ix.(year ?). (*Smee*). (*139*).

Paralectotypes: 5 apterous, 4 alate viviparous females, 7 nymphs, 1 larva. Data as lectotype. (*138*, *139*).

BIOMETRIC DATA. Lectotype alata: body length 1·66 mm, antennal flagellum 1·02 mm, ratios of segments III–VI 31 : 31 : 23 : 14 + 39, secondary rhinaria on III 8, siphunculus 0·19 mm, cauda 0·12 mm, caudal hairs 5, ultimate rostral segment 0·097 mm, second segment of hind tarsus 0·083 mm, eighth tergite with 2 hairs, articular diameter of ant. seg. III 16μ, longest hair on ant. seg. III 12μ, on hind femur 20μ, on hind tibia 30μ, on eighth tergite ±25μ.

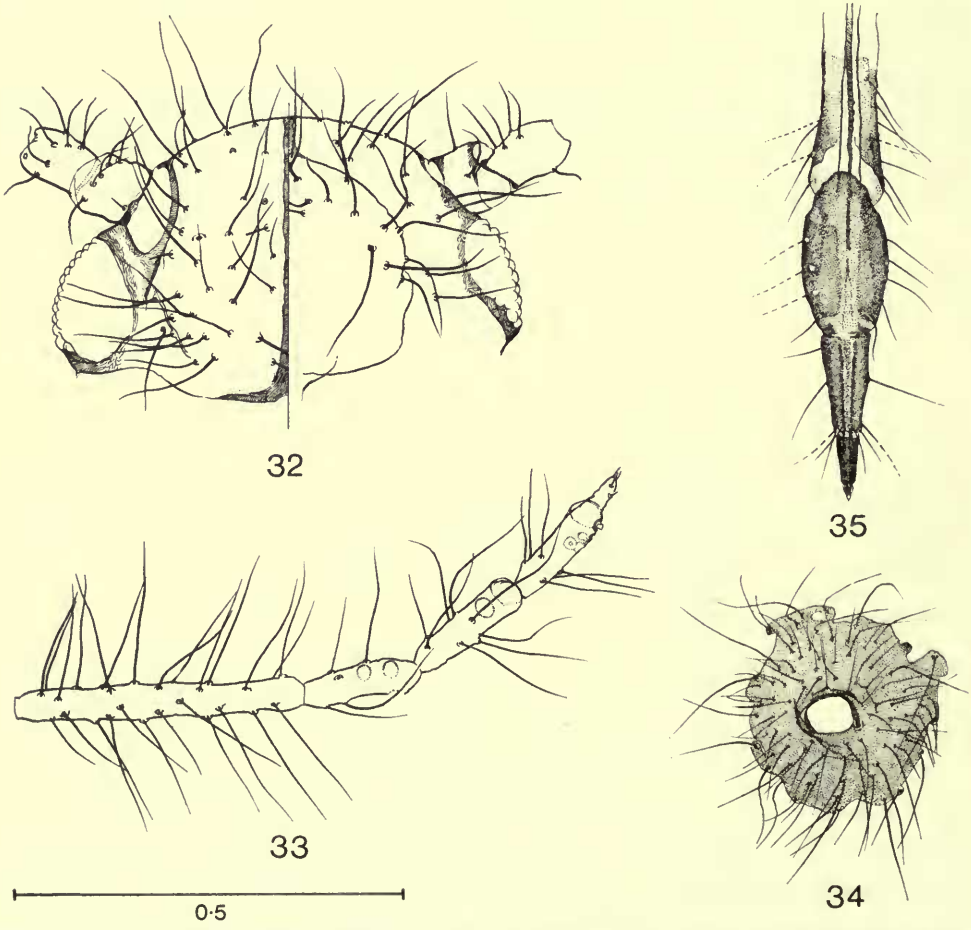
Paralectotype aptera: body length 1·84 mm, ant. flag. 1·08 mm, ratios segs III–VI 34 : 25 : 22 : 13 + 41, siph. 0·29 mm, cauda 0·14 mm, caudal hairs 4, ult. rost. seg. 0·10 mm, second seg. hind tarsus 0·09 mm, eighth tergite with 2 hairs, artic. diam. ant. seg. III 24μ, longest hair on ant. seg. III 14μ, on hind femur ±30μ, on hind tibia 35μ, on eighth tergite ? (not measurable).

Both Buckton's slides have been labelled *Aphis gossypii* Glover by Laing. Theobald (1927 : 141, 145) published this synonymy and subsequent authors have accepted it.

Lachnus cupressi Buckton = ***Cinara cupressi*** (Buckton)

(Pl. 4, fig. 62; Text-figs 32–35)

Lachnus cupressi Buckton, 1881 : 46; pl. 102, figs 1–3.
Lachnus juniperinus Mordvilko, 1894 : 134.
Lachniella tujae Del Guercio, 1909 : 309.
[*Lachnus juniperi* (De Geer); van der Goot, 1915 : 396. Misidentification.]
Dilachnus cupressi (Buckton) Swain, 1921 : 212.
Lachnus sabinae Gillette & Palmer, 1924 : 9.
Panimerus cupressi (Buckton) Theobald, 1929 : 148.
[*Panimerus juniperi* (De Geer) Theobald, 1929 : 151 partim.]
Panimerus tujae (Del Guercio) Theobald, 1929 : 153.
Cinara cupressi (Buckton) Börner & Schilder, 1932 : 570; Braun, 1938 : 480; Hottes & Essig, 1953 : 172; Szelegiewicz, 1962 : 83.



Figs 32–35. *Cinara* (*Cupressobium*) *cupressi* (Buckton). Lectotype: Fig. 32. Head, upper (left) and lower surfaces. Fig. 33. Right antennal segments III–VI. Fig. 34. Siphunculus. Paratype (*140a*): Fig. 35. Apex of rostrum.

Cinara tujae (Del Guercio) Braun, 1938 : 480.
Neochmosis cupressi (Buckton) Kloet & Hincks, 1945 : 70.
Neochmosis tujae (Del Guercio) Kloet & Hincks, 1945 : 70.
Cupressobium cupressi (Buckton) Börner, 1952 : 45.
Cinara canadensis Hottes & Bradley, 1953 : 86.

LECTOTYPE here designated: apterous viviparous female. Cornwall, Probus. *Cupressus* sp. 17.xi.1879. (*Boscawen*). (*140**).

Paralectotypes: 3 apterous, 1 alate viviparous females, 1 nymph. Data as lectotype. (*140a**, *140b**, *140c**, *140d**, *140e**).

Apterous viviparous female. (Plate 4, fig. 62; Text-figs 32–35). *Colour* of macerated specimen: head and body more or less uniformly pale brown; antennae with segments I and II pale brown as head, III paler with very slight darkening at apex, IV and V with basal halves pale, apical halves and whole of VI slightly darker. Apical segments of rostrum dark brown. Coxae and trochanters dark brown; femora pale on basal half, the rest somewhat darker; tibiae pale with a small dark brown area at the knee and less pronounced darkening at the apices; tarsi brown. Siphuncular cones, cauda, anal and subgenital plates, stigmal plates and muscle-plates brown. *Morphology:* body 2·70–2·92 mm long, broadly oval, about 1·7 times as long as broad. Head more or less semicircular in outline, clothed with numerous long fine hairs, the longest (frontal) reaching about 145μ. Antennae of 6 segments, about one-third as long as the body, with rather numerous long fine hairs ranging maximally from 177–197μ on segment III. II with 9 or 10 hairs, VI with 4–6 hairs confined to the basal third of the segment, processus terminalis with 3 subapical setae; length ratios of segments III–VI about 36 : 15 : 17 : 14 + 4, secondary rhinaria confined to IV, with 1 or 2, and V, with 1. Rostrum reaching a little beyond third coxae, ultimate segments 0·147 and 0·085 mm long respectively, slender and tapering, fourth segment with 3 or 4 non-apical hairs. Legs short and stout with numerous long fine hairs reaching about 200μ on hind tibia, which is about two-fifths of the body length. First tarsal segment with dorsal side much shorter than the basal diameter (23 : 42μ). Second tarsal segment 0·24–0·26 mm long, slightly longer than rostral segments 4 and 5 together. Abdominal dorsum membranous with conspicuous muscle-plates, small sclerotic stigmal plates, a transverse row of 4 scleroites on tergite VII and two irregular transverse sclerotic bands on VIII. Siphuncular cones from 0·25–0·30 mm in diameter, shallow (quite unlike Buckton's exaggerated figure), with numerous hairs in 4–5 whorls. Cauda very broadly triangular with more or less rounded sides, about one-third as long as its basal width.

NOTES. In this instance Buckton's published figures are an improvement on his originals, which are carelessly drawn and crudely coloured. His notes add nothing to the published record.

Hyalopterus dilineatus Buckton = ***Longicaudus trirhodus*** (Walker)

Buckton, 1879 : 113; pl. 76, figs 1–7.

LECTOTYPE here designated: alate viviparous female. Northumberland, Alnwick. *Rosa centifolia* var. *muscosa* ('Moss Rose'). v. (year ?). (*Hardy*). (*147*).

Paralectotypes: 1 larva, 4 nymphs. Data as lectotype. (*146*).

BIOMETRIC DATA. Lectotype, alata: body length 1·88 mm, antennal flagellum 1·38 mm, ratios of segments III–VI 95 : 21 : 21 : 16 + 20, secondary rhinaria on III 84, siphunculus 0·10 mm, cauda 0·22 mm, caudal hairs 14, ultimate rostral segment 0·09 mm, second segment of hind tarsus 0·14 mm, eighth tergite with 4 hairs, articular diameter of ant. seg. III 32μ, longest hair on ant. seg. III 16μ, on hind femur 30μ, on hind tibia 40μ, on eighth tergite ±20μ.

Buckton's specimens named *dilineatus* are a mixture of *Longicaudus trirhodus* (Walker) (see above; *146*, *147*), *Macrosiphum rosae* (L.) (*146*) and *Myzaphis bucktoni* Jacob (3 apt. viv. females on *145**, *145a**, *145b**). The slide data on *146* and *147* indicate that the *trirhodus* and *rosae* are the material sent by Hardy from Alnwick, referred to under Buckton's description of the nymph (1879 : 113). The three apterae of *bucktoni*, therefore, would seem to belong to the material recorded from Haslemere and Wanstead on *Rosa centifolia* in July (the slide labels include no locality or date). Wanstead suggests Walker, but none of Walker's extant slides contains *bucktoni*. A Walker slide (*W. 841*) in Buckton's collection contains *rosarum* Kaltenbach which Buckton may have confused with *bucktoni*.

On his plate of *dilineatus* Buckton figures the young larva, nymph and alata of *trirhodus*, and the adult aptera of *bucktoni*. His original drawing of the adult aptera is a good representation of *bucktoni*, better than the coloured lithograph, and shows (what the latter does not) that Buckton was uncertain of the true length of the siphunculi, leaving their extremities unfinished and indicated only vaguely by dotted lines. From his manuscript notes, which accurately describe his drawing, it seems that at first he regarded *bucktoni* as the adult aptera of *dilineatus*, but in his published account he modifies this view and describes the larva of *trirhodus* as the adult aptera (I regard the larva on *146* as his probable model), adding a brief description of 'variety α' which, as Jacob (1946 : 110) points out, refers to *bucktoni* (but he omitted to alter the caption to figure 3 accordingly). The descriptions of the nymph, and the alata bred from one of the nymphs sent by Hardy, certainly refer to *trirhodus*.

Buckton also describes and figures (figs 5, 6, 7) the oviparous female of *dilineatus*, but there is no specimen of an ovipara so named and the original drawings for these figures are missing. Figures 6 and 7, showing an enlarged antenna and abdominal appendages, suggest *Myzaphis rosarum* (Kaltenbach), but there is no proof that this is so, and the identity of the ovipara must remain uncertain.

Since three of the four morphs described and figured are all supported by specimens of *Longicaudus trirhodus*, I place *dilineatus* Buckton, as other authors have done, as a synonym of *trirhodus* Walker.

Theobald (1927 : 38) places *dilineatus* in *Longicaudus* and redescribes it, believing it to be distinct from *trirhodus*. However, he quotes Laing as being doubtful whether Buckton's alate female is distinct from *trirhodus*. Hille Ris Lambers (1934 : 26) considers Theobald's material named *dilineatus* to be *trirhodus* Walker. It is unlikely that he saw Buckton's material. Jacob (1946) gives a full account of *Myzaphis bucktoni*, which he identifies with the description and figure of Buckton's 'variety α' of *dilineatus*, but without having seen Buckton's specimens. Buckton's three adult apterae of *bucktoni* agree in all respects with Jacob's diagnosis.

Aphis edentula Buckton = ***Rhopalosiphum insertum*** (Walker)

Aphis inserta Walker, 1849*b*: app. xxxix. Lectotype, alate viviparous female, ENGLAND: Essex (BMNH).

Aphis edentula Buckton, 1879 : 39; pl. 48, figs 1–3. **Syn. n.**

(For full synonymy, see Doncaster, 1961 : 86.)

LECTOTYPE here designated: ovipara. Essex, Wanstead. *Crataegus monogyna*. 7.xi.(year ?). (*Walker*). (*130*).

BIOMETRIC DATA. Lectotype, ovipara: body length 1·52 mm, antennal flagellum 0·51 mm, ratios of segments III–V 23 : 10 : 8 + 22, siphunculus 0·12 mm, cauda not measurable, caudal hairs 5 (?), ultimate rostral segment 0·10 mm, second segment of hind tarsus 0·10 mm, eighth tergite with 4 (?) hairs, articular diameter of ant. seg. III 16μ, longest hair on ant. seg. III 10μ, on hind femur 12μ, on hind tibia 25μ, on eighth tergite ±25μ.

Buckton describes the apterous viviparous female, the nymph, the alate viviparous female and the ovipara, but he figures only the last three morphs. The specimens, he says, were sent to him by Walker, who collected them from *Crataegus* at Wanstead in November. There are no slides in Buckton's collection labelled *edentula* and, from the data available, I can trace no specimens which might have been his models for the nymph and alata. But on slide *130*, labelled '*A. crataegi* Walk: ovip. female. Nov.' in Buckton's hand, are three oviparae of *Rhopalosiphum insertum* (Walker), one of which corresponds reasonably well with the original for figure 3 and his measurements and description of the oviparous *edentula*. Since the data on the slide correspond with the published data and also with a manuscript note on the sheet of original drawings 'ovip. female on Whitethorn Nov. 7. Walk.', I believe this specimen to be Buckton's type of the ovipara of *edentula*, which I therefore place as a synonym of *insertum* Walker.

Theobald (1927 : 213) quotes Buckton's account of *edentula* in full, adding only that the species is not represented in Buckton's collection.

Börner (1952 : 70) correctly puts *edentula* as synonym of *oxyacanthae* Schrank = *insertum* Walker.

Schizoneura fodiens Buckton = ***Schizoneura ulmi*** (L.)

Buckton, 1881 : 94; pl. 106, figs 6–12.

LECTOTYPE here designated: apterous viviparous female. Surrey, Haslemere. *Ribes nigrum*. 15.x.(year ?). (*Buckton*). (*183**).

Paralectotypes: 3 alate viviparous females, 12 nymphs, data as lectotype. (*181**, *182*, *183a**, *184*).

BIOMETRIC DATA. Lectotype, aptera: body length 1·54 mm, whole antenna 0·32 mm, ratios of segments I–V 13 : 11 : 28 : 13 : 37, siphuncular diameter 0·07 mm, ultimate rostral segment 0·13 mm, second segment of hind tarsus 0·08 mm, articular diameter of ant. seg. III 33μ, longest hair on ant. seg. III 45μ, on hind femur 40μ, on hind tibia 50μ.

Paratype, alata: body length 1·72 mm, antennal flagellum 0·63 mm, ratios segs III–VI 50 : 12 : 8 : 5 + 3, secondary rhinaria on seg. III 18, on IV 2, on V 0, on VI 0, siph. diam. 0·07 mm, ult. rost. seg. 0·13 mm, second seg. hind tarsus 0·10 mm, artic. diam. ant. seg. III 16μ, longest hair on ant. seg. III 42μ, on hind femur 44μ, on hind tibia 50μ.

Buckton describes and figures the apterous viviparous female, nymph and alata, and adds figures of a newborn larva and details of wings and alate antenna. All his specimens named *fodiens* are *Schizoneura ulmi* (L.), and I have selected as lectotype the single aptera on *183*, the slide data of which correspond exactly with those of his original drawing of that morph (fig. 6), and which was doubtless the specimen

described and figured. Buckton's published description is incorrect in giving the antennal length as 'three quarters the length of the body'; his MS notes give the ratio as one-third, and his published measurements (antenna 0·38 mm : body 1·39 mm) are about right when matched with the mounted specimen. The specimen is rather small for an apterous exule of *ulmi*, and the tarsi are less spinulose than those of other specimens I have examined, but other characters, particularly the wax-gland rosettes with conspicuous central ring, agree well.

Endeis formicina Buckton = ***Baizongia pistaciae*** (L.)

Buckton, 1883 : 91; pl. 129, figs 1 and 3.
(For synonymy, see *aedificator*, p. 31.)

LECTOTYPE here designated: apterous viviparous female. Northumberland, Cheviot. *Poa pratensis* (? or *Carex dioica*) roots. v. (year ?). (*Hardy*). (*189**).

Biometric data. Lectotype, aptera: body length 1·46 mm, whole antenna 0·27 mm, ratios of segments I–V 17 : 16 : 16 : 13 : 31, ultimate rostral segment 0·13 mm, second segment of hind tarsus 0·10 mm, primary hairs on subanal plate 8, longest hair on subanal plate ±80μ, eighth tergite with 6 hairs, the longest ±80μ.

Buckton's original slide labelled *Endeis formicina* (mis-spelled '*formacina*') contained 14 specimens belonging to four species: *Forda formicaria* Heyden, *Smynthurodes betae* Westwood, *Geoica eragrostidis* (Passerini) and *Baizongia pistaciae* (L.). I have remounted these specimens on separate slides (*189**, *189a*–e**) and compared them with Buckton's description and figures of *formicina*. The specimen that agrees most closely, particularly with the characters shown in the original drawings of whole insect and antenna (used for figs 1 and 3 on the plate) is the aptera of *Baizongia pistaciae* (L.). Further confirmation that this was the specimen figured is given by Buckton's MS notes in which the host plant is recorded as *Poa pratensis*, and the code letters $\frac{F}{V}$, which appear on the slide, are also written beside the drawing. The colour characters given in the published description (1883 : 91) agree well with those of the original drawing, but the host plant is published as *Carex dioica*. The specimens were sent by Hardy, whose name also appears on the original drawing. I therefore choose this specimen as lectotype of *formicina* Buckton.

Theobald, who recorded (1929 : 193) having seen Buckton's slide, and who also realised that it contained four species, placed *formicina* as a doubtful synonym of *Geoica squamosa* Theobald *nec* Hart (= *eragrostidis* Passerini). Börner (1952 : 197) concluded from Buckton's figures that *formicina* should be assigned to *Pemphigus*. Stroyan (*in* Kloet & Hincks, 1964 : 86) correctly placed *formicina* as synonym of *pistaciae* (L.).

Lachnus formicophilus Buckton: *nomen dubium*

Lachnus formicophilus Buckton, 1901 : 257.
Lachnus formicophilus Buckton; Donisthorpe, 1902 : 39.
Lachnus formicophilus Buckton; Schouteden, 1906*a* : 201.
Lachnus formicophilus Buckton; Donisthorpe, 1927 : 167, partim.

Buckton describes and figures a specimen sent him by Donisthorpe, who took it

from a nest of *Formica rufa* at Oxshott, Surrey. Buckton gives no date, but Donisthorpe (1902) refers to this specimen and gives the date as 1900. Donisthorpe (1927) records collecting *formicophilus* from nests of *F. rufa* on 24 April, 1900, at Oxshott, and again on 6 September, 1912, at Weybridge. The Oxshott record doubtless refers to the specimen, now lost, which Buckton described; that from Weybridge is described by Theobald (1929 : 351) as *Lachnus* (?) *formicophilus* Buckton and is now in the BMNH collection.

Buckton's description is so vague that it is impossible to determine what he had before him. His roughly-sketched figure shows an aphid with long antennae and legs, rather narrow wings with normal aphidine venation, and an abdomen either shrivelled almost to nothing or absent altogether. The body is said to be small, globular, black, and covered with white flocculent matter, and the expanse of the wings is given as 11·0 mm. Buckton identifies it as a male.

The unusually large wing span and absence of visible siphunculi and cauda may have led Buckton to place this specimen in *Lachnus*, but the long antennae (about three-quarters of the length of the wings) must preclude this. The sketch certainly suggests a large aphid, possibly a Callipterine, e.g. *Euceraphis punctipennis* (Zetterstedt), or, if the wing span were not so large, *Phyllaphis fagi* (L.), which would accord with the flocculence. But if the specimen were indeed that taken by Donisthorpe on 24 April, the possibility of its being a male must be remote. I find myself in agreement with Schouteden (1906) when he writes: '. . . il me semble un peu exagéré de déclarer myrmécophile un Aphide, parce qu'un unique exemplaire, et surtout une forme ailée! s'en est rencontré dans un nid de fourmis', and I regard *formicophilus* Buckton as a *nomen dubium*.

Donisthorpe's second specimen is an apterous viviparous female of *Lachnus* (*Schizodryobius*) *longirostris* (Börner), or possibly *exsiccator* (Altum) (= *pallipes* Hartig), as Börner (1952 : 46) supposed, basing his conclusion, presumably, on Theobald's description and figure.

Lachnus fuliginosus Buckton = ***Tuberolachnus salignus*** (Gmelin)

Aphis saligna Gmelin, 1790 : 2209.
Lachnus punctatus Burmeister, 1835 : 93.
Aphis viminalis Boyer de Fonscolombe, 1841 : 184.
[*Lachnus longipes* Dufour; Buckton, 1881 : 59. Misidentification.]
Lachnus fuliginosus Buckton, 1891*b* : 40.
Tuberolachnus viminalis (Boyer de Fonscolombe) Mordvilko, 1909 : 374, Das, 1918 : 257.
Lachnus viminalis (Boyer de Fonscolombe); van der Goot in Das, 1918 : 142.
Pterochlorus viminalis (Boyer de Fonscolombe); Swain, 1921 : 211.
Pterochlorus salignus (Gmelin) Theobald, 1929 : 104.
Tuberolachnus salignus (Gmelin) Börner, 1952 : 45.

LECTOTYPE here designated: alate viviparous female. PAKISTAN, Quetta. 1890 ? (*Elliot* ?). (*197**).

Paralectotypes: 2 apterous viviparous females, 1 nymph. Data as lectotype. (*196**, *198**).

Biometric data. Lectotype, alata: body length 4·60 mm, antennal flagellum 1·40 mm, ratios of segments III–VI 35 : 11 : 13 : 12, secondary rhinaria on III 9, on IV 2, on V 0, siphuncular diameter 0·12 mm, ultimate rostral segment 0·19 mm, second segment of hind tarsus 0·36 mm, articular diameter of ant. seg. III 36μ, longest hair on ant. seg. III 70μ, on hind femur 80μ, on hind tibia 60μ.

Paralectotype, aptera: body length 2·84 mm, ant. flag. 0·82 mm, ratios segs III–VI 46 : 20 : 24 : 28, siph. diam. 0·11 mm, ult. rost. seg. 0·19 mm, second seg. hind tarsus 0·31 mm, artic. diam. ant. seg. III 40μ, longest hair on ant. seg. III 40μ, on hind femur 40μ, on hind tibia 55μ.

A sample of aphids said to have been taken on apricot, almond and peach trees at Quetta in 1890 was sent by the Indian Museum, Calcutta, to Buckton for identification. Believing he had a new species, he named it *Lachnus fuliginosus* and described and figured the larva, nymph and alata. There are in the BMNH 15 specimens from the sample sent from Quetta, originally mounted by Buckton on two slides. They include the three morphs Buckton described, as well as several adult apterae, and are a mixture of two species, *Tuberolachnus salignus* (Gmelin) and *Pterochloroides persicae* (Cholodkovsky). The descriptions of nymph and alata, and the three morphs figured (alata, nymph and aptera or larva) all agree with the characters of *salignus:* only the description of the larva agrees with *persicae.* These descriptions correspond closely with five specimens originally on one of Buckton's slides (2 apterae, a nymph and an alata of *salignus* and an aptera of *persicae*), named *fuliginosus,* which were remounted by Laing in 1916 on three separate slides. I regard these specimens as the type-material on which Buckton based *fuliginosus.* The second of Buckton's original slides (*199*) contains five apterae and five larvae of *persicae* only, and is labelled simply '*Lachnus* n.s. . . . Quetta', without specific name. For this reason I exclude these specimens from the type-series, although they appear to have formed part of the original sample.

Das (1918 : 258–9, 266–7) records having examined in the Indian Museum part of the same material which had been sent to Buckton, and he found that it contained a mixture of the same two species. He suggests that there may have been some accidental mixing of samples which could account for the inclusion of the *Salix*-feeding *salignus* among the *persicae* taken from *Prunus.* He realised that most of Buckton's descriptions and all his figures relate to *salignus,* and he states, moreover, that in the course of his work on elucidating *fuliginosus,* he not only compared the Calcutta material with Buckton's published account, but also sent for 'the insect from Quetta', from which I infer that he may have had an opportunity to examine at least one of the specimens originally sent to Buckton. This supposition is strengthened by Theobald (1929 : 108) who writes 'Mr Laing has examined the type of Buckton's *fuliginosus* and finds it is undoubtedly this species [i.e. *salignus*]. Buckton's slides contain *viminalis* [= *salignus*] and *persicae,* so *fuliginosus* is really a composite species, but Das selected the type and sank it as a synonym of *viminalis.*'

Although Theobald's statement implies the existence of a type of *fuliginosus,* I can find no evidence that a type designation was ever published, or even contemplated. None of the specimens now in the BMNH bears any type-label or equivalent indication, and although Dr A. P. Kapur, at my request, has kindly searched the

collections in the Zoological Survey of India, which hold type-material of some of Buckton's Indian aphid species, *fuliginosus* seems not to be among them. If in fact one of Buckton's specimens was sent to Das for examination, it would most probably have been the alate female of *salignus*, mounted by Laing singly on slide *197*, rather than the nymph on *198*, or the two apterae of *salignus* and one of *persicae* on *196*. In the belief that this alata is the specimen most likely to have been the subject of Theobald's statement quoted above, I designate it here as lectotype of *Lachnus fuliginosus* Buckton.

Schizoneura fuliginosa Buckton = ***Schizolachnus pineti*** (Fabricius)

Aphis pineti Fabricius, 1781 : 389.
Aphis tomentosa Villers, 1789 : 549.
Schizoneura fulginosa Buckton, 1881 : 96; pl. 107, figs 1–6.
Glyphina pilosa Buckton, 1883 : 16.
Schizolachnus tomentosus (Villers) Mordvilko, 1909 : 375, Swain, 1921 : 212, Theobald, 1929 : 161.
Schizolachnus pineti (F.) Börner, 1952 : 40

LECTOTYPE here designated: alate viviparous female. Surrey, Haslemere, Weycombe. *Pinus nigra* var. *austriaca*. Undated. (*Buckton*). (*194*).

Paralectotypes: 1 apterous viviparous female, 2 larvae ('29.x.'), 2 larvae, undated. Data as lectotype. (*193, 195*).

Biometric data. Lectotype, alata: body length 2·38 mm, antennal flagellum 0·86 mm, ratios of segments III–VI 49 : 20 : 20 : 18, secondary rhinaria on III 8, siphuncular diameter 0·07 mm, ultimate rostral segment 0·14 mm, second segment of hind tarsus 0·26 mm, articular diameter of ant. seg. III 24μ, longest hair on ant. seg. III 140μ, on hind femur 200μ, on hind tibia 200μ.

Paralectotype, aptera: body length 2·28 mm, ant. flag. 0·64 mm, ratios segs III–VI 34 : 16 : 14 : 17, siph. diam. 0·04 mm, ult. rost. seg. 0·14 mm, second seg. hind tarsus 0·27 mm, artic. diam. ant. seg. III 32μ, longest hair on ant. seg. III 120μ, on hind femur 140μ, on hind tibia 160μ.

Buckton describes and figures the adult aptera and alata, and also the nymph, a morph which is not included among his specimens. Figure 3, said to be an apterous male, appears to have been drawn from a young larva on *195*. His descriptions and figures agree tolerably well with the corresponding specimens.

Siphonophora rosae var. *glauca* Buckton = ***Macrosiphum rosae*** (L.)

Buckton, 1876 : 109; pl. 3, figs 1–3, 5–7.

There are no slides named *glauca* in the Buckton Collection and no indication in the published text of the characters Buckton uses to distinguish *glauca* from *rosae* L. His original drawings carry no manuscript notes, but resemble *rosae* so closely in appearance that I agree with Börner (1952 : 293) in regarding *glauca* as a synonym of *rosae* L.

Myzus gracilis Buckton = ***Metopolophium dirhodum*** (Walker)

Buckton, 1876 : 176; pl. 34, figs 4, 5.
(For synonymy, see Doncaster, 1961 : 58.)

LECTOTYPE here designated: alate viviparous female. Surrey, Shottermill. *Acer pseudoplatanus*. xi. (year ?). (*Buckton*). (*210**).

Paralectotype: alate male. Data as lectotype. (*210a**).

Biometric data. Lectotype, alata: body length 2·80 mm, antennal flagellum not measurable (both incomplete), ratios of segments III-base VI 73 : 48 : 46 : 22 + ?, secondary rhinaria on III 21, siphunculus 0·41 mm, cauda 0·23 mm, caudal hairs 9, ultimate rostral segment 0·11 mm, second segment of hind tarsus 0·17 mm, eighth tergite with 4 hairs, articular diameter of ant. seg. III 32μ, longest hair on ant. seg. III 12μ, on hind femur 24μ, on hind tibia 40μ, on eighth tergite 55μ.

Buckton describes and figures the alate viviparous female and alate male, which he records as having been taken on sycamore 'in company with *Chaitophorus aceris*' in November. (In the legend to the plate the male, fig. 4, is mistakenly ascribed to *ribis*.) Buckton's original slide, named *Myzus gracilis*, contained the alate female and alate male, which correspond with his text and figures and which I regard as his types, together with four larvae of *Periphyllus acericola* (Walker). All have been remounted.

Rhizobius graminis Buckton = ***Aploneura lentisci*** (Passerini)

Tetraneura lentisci Passerini, 1856 : 264.
Aploneura lentisci (Passerini) Passerini, 1863 : 201.
[*Tychea eragrostidis* (Passerini ?) Buckton, 1883 : 89, partim. Misidentification.]
Rhizobius poae Buckton, 1883 : 93, nec Thomas, C. A., 1879 : 166.
Rhizobius graminis Buckton, 1883: note below legends to pl. 129.
Tycheoides eragrostidis Schouteden, 1906*a* : 194.
Neorhizobius poae del Guercio, 1917 : 247.

LECTOTYPE here designated: apterous viviparous female. Northumberland, Cheviot Hills. *Poa annua* roots. Undated. (*Hardy* ?). (*358*).

Paralectotypes: 7 apterous viviparous females. Data as lectotype. (*358*).

Biometric data. Lectotype, aptera: body length 1·56 mm, whole antenna 0·25 mm, ratios of segments I–V 14 : 15 : 10 : 10 : 29, ultimate rostral segment 0·085 mm, second segment of hind tarsus 0·080 mm, longest hair on antenna 12μ, on hind femur 14μ, on hind tibia 14μ, on eighth tergite 24μ, on cauda 24μ.

Buckton first describes this species as *Rhizobius poae* in the fourth volume of his monograph, but after the text had been printed he discovered that the name had already been published by Cyrus Thomas for an American species in 1879. He therefore concedes priority to *poae* Thomas and substitutes *graminis* for his own species in a note added below the figure legends for plate 129.

Buckton's slide (*358*, still labelled '*poae*') contains eight apterous females of *Aploneura lentisci* (Passerini) and four apterae of a *Pemphigus* species, all reasonably well preserved. He figures both these species, *lentisci* in figs 9 and 11, and the

Pemphigus in 10 and 12. The original sketch for fig. 9 is a careful and accurate drawing of the adult aptera of *lentisci*, and his published description corresponds closely with it. The sketch of the *Pemphigus* is rough and shows the ventral aspect only. I therefore place *graminis* Buckton as a synonym of *lentisci* Passerini. Buckton's sketch for figure 9 can be matched fairly closely with one of the specimens of *lentisci* on *358*, and this I regard as Buckton's type of *graminis*.

The mixture of species on Buckton's slide and in his figures of *graminis* led Theobald (1929 : 213, 262, 265) to synonymize *graminis* with *auriculae* Murray (*Pemphigus*) and also, doubtfully, with *lentisci*. Records by Theobald (1915 : 151), Willcocks (1922 : 58, 1925 : 122) and Hall (1926 : 47) of *graminis* Buckton on roots of Gramineae in Egypt all refer to *lentisci*.

Pemphigus immunis Buckton

[*Pemphigus bursarius* (L.); Passerini, 1863 : 198, Courchet, 1879 : 49, 93, pl. 5, fig. 4, Buckton, 1881: pl. 113, figs 6–8, Kessler, 1882: pl. 1, figs 2–5, Lichtenstein, 1885: pl. 3, figs 1, 2, 1886 : 26, del Guercio, 1900 : 98. Misidentifications.]
Pemphigus immunis Buckton, 1896 : 51.
Pemphigus lichtensteini Tullgren, 1909 : 148.
Pemphigus globulosus Theobald, 1915 : 147.
[*Pemphigus napaeus* Buckton; Tseng & Tao, 1936 : 168, Takahashi, 1938 : 14. Misidentifications.]

Lectotype (designated by Doncaster, 1969 : 159): alate viviparous female (fundatrigenia migrans). INDIA, Kashmir, Gilgit Road, Bunji. c. 1400 m. *Populus ?euphratica*. 2.vii.1895. (*Alcock*). (BMNH *217**).

Paralectotypes: 1 alate viviparous female (fragmentary), 4 nymphs. Data as lectotype. (BMNH *217**, *219**). 1 alate viviparous female, 5 nymphs, 2 larvae (some fragmentary). Data as lectotype. (Zoological Survey of India, Calcutta, 7262/H7*, 7263/H7*).

I have already dealt elsewhere (Doncaster, 1969) with Buckton's Indian material of *immunis*, including descriptions of lectotype and paralectotypes.

It is interesting to note that when Buckton described *immunis* as new in 1896 he already had material of this species in his collection and had included in his monograph figures of the fundatrix, the antenna of the alate migrant, and the gall (Buckton, 1881 : pl. 113, figs 6-8). The specimens had been sent to him from Montpellier by Lichtenstein who believed them to be *bursarius*, and some of them that Buckton mounted, including those he drew, are still extant, though not the gall. The aphids comprise a fundatrix, whole specimens and fragments of eight or nine nymphs, and an alate migrant (*78a**, *78b**, *79*). In Buckton's published description of *bursarius* (1881 : 117), and his figures of it on plate 111, based on British material, he is correct in his identifications of specimens and galls, but includes his figures of *immunis* in a subsequent plate (113) and repeats Lichtenstein's error in ascribing them to *bursarius*. Buckton's original sketch of the gall of *immunis* gives a better impression of its colour, texture and position on the twig than the published lithograph.

Though widely distributed throughout the palaearctic and temperate oriental regions, *immunis* has not hitherto been recorded in Britain.

Aphis instabilis Buckton = ***Brachycaudus cardui*** (L.)

Aphis cardui L., 1758 : 452. (Linnaeus left no aphid types.)
Aphis instabilis Buckton, 1879 : 94; pl. 68, figs 1–5. **Syn. n.**

LECTOTYPE here designated: alate viviparous female. Surrey, Haslemere, Weycombe. *Matricaria inodora*. 18.vi.(year ?). (*Buckton*). (*220*).

Paralectotypes: 3 alate viviparous females, 9 nymphs, 1 larva. Data as lectotype. (*220*).

Biometric data. Lectotype, alata: Body length 1·56 mm, antennal flagellum 1·46 mm, ratios of segments III–VI 58 : 38 : 28 : 14 + 46, secondary rhinaria on III 30, siphunculus 0·30 mm, cauda 0·12 mm, caudal hairs 6, ultimate rostral segment 0·19 mm, second segment of hind tarsus 0·14 mm, articular diameter of ant. seg. III 26μ, longest hair on ant. seg. III 12μ, on hind femur 22μ, on hind tibia 30μ, on eighth tergite ±50μ.

Buckton describes the apterous viviparous female, two varieties of the nymph, and the alate female of *instabilis*, which he collected from *Pyrethrum inodorum* (now *Matricaria inodora*) and also *Epilobium montanum* and *E. parviflorum*. His manuscript notes suggest that material from both *Matricaria* and *Epilobium* was collected at Weycombe, but in his published account he mentions having received material from *Epilobium* from Barrett in Pembroke. Buckton's figures, and especially his original sketches, suggest that *instabilis* is based on at least two species, but his data are confusing. There are no specimens named *instabilis* in Buckton's collection. There is, however, a slide (*220*), unnamed but labelled 'Pyrethrum. June.' in Buckton's hand, which Theobald examined and believed to contain *instabilis*. It contains alatae, nymphs and a larva of *Brachycaudus cardui* (L.), correctly identified by Laing who, however, in a note on the slide envelope, doubted whether they were in fact *instabilis*. Nevertheless, Buckton's drawing of the nymph in figure 3 and that of the larger and darker of the two alatae (figure 4) seem to relate to his MS notes on specimens from *Matricaria*, dated June 18, in which case the alatae and nymphs of *cardui* on *220* could supply the models, as Theobald surmised. But the alata in figure 5, said to be newly emerged, is clearly something different. Apart from its pale green colour, its cauda is too big for *cardui* and, in the original, though not the reproduced figure, marginal tubercles are clearly indicated on the seventh abdominal segment, characters which suggest that it may have been either a vagrant, or taken from among material from *Epilobium*.

Buckton's drawings of the aptera (perhaps drawn from a larva—the measurements he gives are small for an adult) and 'var. 1' of the nymph (figures 1 and 2) certainly do not look like *cardui* and could well be of an *Epilobium*-feeding aphid. He describes the siphunculi of both morphs as pale, and notes the presence in the aptera of two small tubercles on the antepenultimate abdominal segment: characters which also could be appropriate to such species. But although specimens of some *Epilobium*-feeders occur in Buckton's collection, they include none that I can relate with

any confidence to *instabilis*. There is one slide (*163*) labelled 'Epilobium. Pembroke.', containing apterae and alatae of *grossulariae* Kaltenbach, which I believe to be material sent by Barrett, but I regard these as the types of *penicillata* Buckton for reasons given below (p. 76). Since the only specimens that can clearly be related to *instabilis* are those from *Matricaria*, I place *instabilis* as a synonym of *cardui* L.

Theobald quotes Buckton's description of *instabilis* twice, once under *Aphis* (1927 : 214) and again under *Anuraphis* (1927 : 289), but does not recognize it as *cardui*. Börner (1952 : 231) thinks it likely to be an *Epilobium*-feeding species but does not identify it.

Rhizobius jujubae Buckton

Buckton, 1883 : 181, 1899*b* : 277.

Laing (1923 : 247) identifies *jujubae* Buckton as '. . . a very young and immature species belonging to the Monophlebinae' (Margarodidae). The single slide of *jujubae*, labelled simply '*Zizyphus jujuba*, India' in Buckton's hand, is in the Coccoidea collections of the BMNH.

Aphis lentiginis Buckton = ***Dysaphis (Pomaphis) plantaginea*** (Passerini)

Aphis pyri Hartig, 1841 : 369, nec Boyer de Fonscolombe, 1841 : 189.
[*Aphis malifolii* sensu auctt. nec Fitch, 1855 : 49. Misidentifications.]
Myzus plantagineus Passerini, 1860 : 31, 35. [No type exists[2].]
Myzus mali Ferrari, 1872*b* : 221.
[*Aphis mali* F.; Buckton, 1879 : 45, partim. Misidentification.]
Aphis lentiginis Buckton, 1879 : 59, pl. 55, fig. 1. **Syn. n.**
[*Dentatus sorbi* (Kaltenbach) van der Goot, 1915 : 177. Misidentification.]
Anuraphis roseus Baker, 1920 : 5.
Dentatus plumbicolor Nevsky, 1929 : 287.
Sappaphis plantaginea (Passerini) Hille Ris Lambers, 1945 : 58, 1948 : 287, Stroyan, 1957*a* : passim.
Sappaphis mali (Ferrari) Börner, 1952 : 98.
Dysaphis (*Pomaphis*) *plantaginea* (Passerini) Stroyan, 1963: passim.

LECTOTYPE here designated: apterous viviparous female (fundatrigenia). Sussex, Horsham, Cowfold. *Pyrus communis*. 8.vi.(year ?). (*Borrer*). (*373d**).

Paralectotypes: 3 apterous viviparous females. Data as lectotype. (*373a**, *b**, *c**).

Biometric data. Lectotype, aptera: body length 2·42 mm, antennal flagellum 1·89 mm, ratios of segments III–VI 58 : 42 : 27 : 13 + 49, siphunculus 0·37 mm, cauda 0·14 mm, caudal hairs 6, ultimate rostral segment 0·15 mm, second segment of hind tarsus 0·14 mm, eighth tergite with 5 hairs, articular diameter of ant. seg. III 34μ, longest hair on ant. seg. III 13μ, on hind femur 34μ, on hind tibia 46μ, on eighth tergite 76μ.

Buckton describes and figures the apterous and alate viviparous females of *lentiginis*, said to have been taken on pear in early June. His manuscript notes on

[2]See Stroyan, 1957*a* : 25.

the original sketches are dated 8 June. There are no specimens named *lentiginis* among Buckton's slides, but a slide (*373*) labelled '*A. Pyraria.* Cowfold. On Pear.' contained apterous and alate specimens (now remounted) which agree closely with his description and figures and which I believe to be his types of *lentiginis*. They are four adult fundatrigeniae of a *Dysaphis* species, either identical with or closely related to *plantaginea* (Passerini), and three alatae of *Rhopalosiphum insertum* (Walker). The four apterae are well preserved and were identified on the original slide by both Laing and Theobald as *Anuraphis roseus* Baker (= *plantaginea* Passerini), though neither connected them with *lentiginis*. Stroyan's (1957) keys for the identification of *Dysaphis* species bring one to the same conclusion, but doubts arise if one accepts Buckton's record that the aphids were taken on pear, since *plantaginea* is confined to apple as primary host.

If pear was indeed the host there might be grounds for regarding *lentiginis* as a 'good' species, since I know of no *Dysaphis* species resembling *lentiginis* that has been recorded on pear in England. It would be tempting to put forward the possibility that *lentiginis* may be the primary host form of *gallica* Hille Ris Lambers, a *Dysaphis* species closely similar in micromorphology to *plantaginea*, the primary host of which is not at present known. But this would seem unlikely since Hille Ris Lambers (1955 : 309) failed in attempts to establish autumn migrants of *gallica* on pear.

Buckton names his species *lentiginis* on account of two coloured areas on the dorsum surrounding the bases of the siphunculi. He mentions them twice, describing them first as 'conspicuous orange-yellow spots' and later as 'rusty blotches'. In his original sketch of the aptera they are shown as dull coppery red, but in the reproduced figure they are coloured bright yellow. The apterae of some species of *Dysaphis* do have reddish or brownish areas at the base of the siphunculi which might be matched with the dull red in Buckton's sketch, but I know of none in which these areas are orange or yellow. Buckton's inconsistency on this point may well raise doubts as to the usefulness of these areas taxonomically, at least in the case of *lentiginis*. Moreoever, Dr F. Leclant tells me (in correspondence) that their presence in other species is variable and that he has noticed them in specimens that are about to moult.

There seems in fact to be no reliable support for the view that *lentiginis* might be a 'good' species apart from Buckton's host record, which cannot be substantiated. Buckton's host identifications are often unreliable and in this instance, moreover, there is added uncertainty in that he did not collect the material himself, but received it from his friend Borrer at Cowfold. I therefore place *lentiginis* Buckton as a synonym of *plantaginea* Passerini.

Siphonophora longipennis Buckton = ***Metopolophium dirhodum*** (Walker)

Buckton, 1876 : 146; plate 20 bis.

(For synonymy, see Doncaster, 1961 : 58.)

LECTOTYPE here designated: alate viviparous female. Norfolk, Norwich. *Poa annua*. 1.xi.(year ?). (*Barrett*). (*270**).

Paralectotypes: 1 alate male, 1 nymphal male. Data as lectotype. (*270**).

BIOMETRIC DATA. Lectotype, alata: body length 2·70 mm, both antennae from middle of segment III to apex missing, siphunculus 0·38 mm, cauda 0·24 mm, caudal hairs 13, ultimate rostral segment 0·11 mm, second segment of hind tarsus not measurable (both tarsi malformed), eighth tergite with 7 hairs, longest hair on hind femur 30μ, on hind tibia 35μ.

Buckton describes the apterous and alate viviparous females, the nymph and the alate male but figures only the last three morphs. The only specimens named *longipennis* by him consist of an alate viviparous female, an alate and a nymphal male of *Metopolophium dirhodum* (Walker), and an alate viviparous female of *Myzus persicae* (Sulzer). The slide is labelled 'Poa annua. Nov. 1.', which agrees with the heading to the manuscript notes on Buckton's original sketches, where the locality is given as Norwich and the collector Barrett. These notes describe only the morphs figured, of which the alate female and nymph are doubtless taken from those morphs on *270*. But although an alate male of *dirhodum* is present in the sample, Buckton's description and figure of the male *longipennis* relate to the alate female of *persicae*. The characteristically porrected antennal tubercles and abdominal markings of *persicae*, mentioned in his description, are clearly depicted in the original sketch (though less clearly in the reproduction), and the published measurement of siphuncular length agrees better with that specimen than with the male *dirhodum*.

I choose the alate female as lectotype of *longipennis*, which name has already been widely accepted as a synonym of *dirhodum* (Walker).

Theobald (1913 : 118) places *longipennis* Buckton in *Macrosiphum*. He gives a fuller description of the apterous viviparous female, from *Poa annua* in Cumberland, but quotes Buckton's account of the other morphs. He moves *longipennis* into *Myzus* in his monograph (Theobald, 1926 : 354). Hille Ris Lambers, who saw Theobald's material of *longipennis*, but not Buckton's, identified it with *dirhodum* (H.R.L., 1933 : 175), and subsequent authors have done likewise.

Siphonophora lutea Buckton = ***Macrosiphum (Sitobion) luteum*** (Buckton)

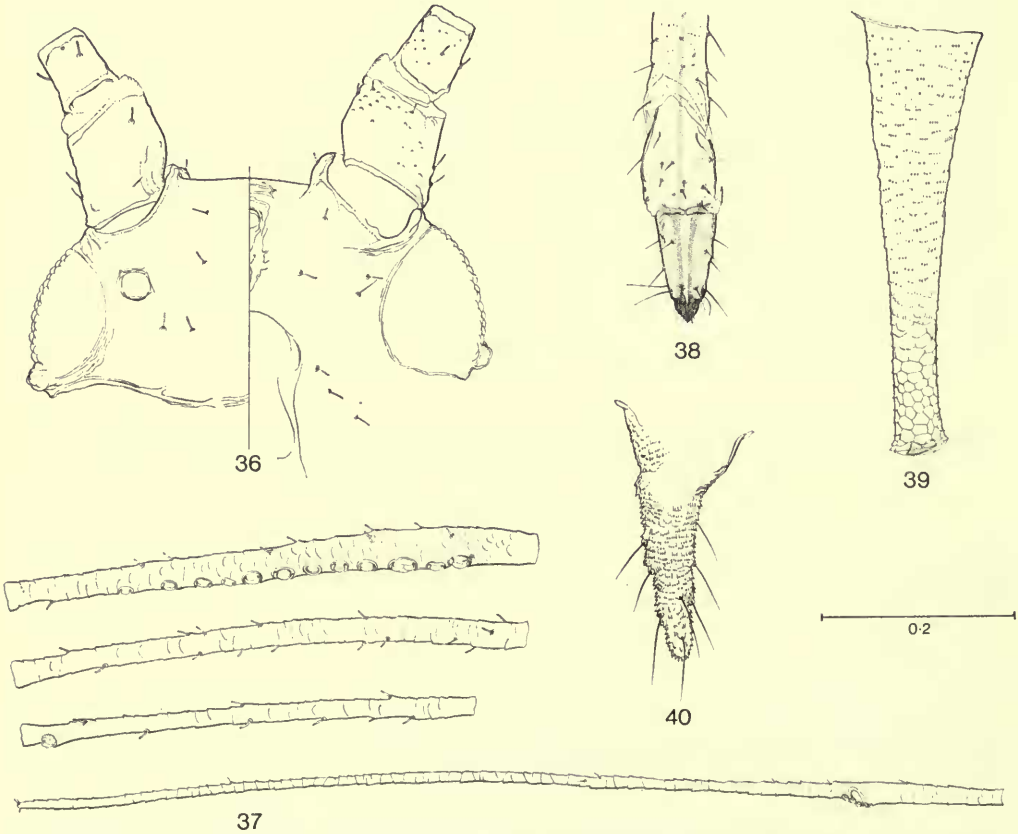
(Pl. 5, fig. 63; Text-figs 36–40)

Siphonophora lutea Buckton, 1876 : 119; pl. 8, figs 1–4.
Macrosiphum luteum (Buckton) Schouteden, 1901 : 114.
Macrosiphoniella lutea (Buckton) del Guercio, 1911 : 332.
Macrosiphum luteum (Buckton); Theobald, 1913 : 82.
Macrosiphum luteum (Buckton); Laing, 1919 : 273.
Macrosiphoniella lutea (Buckton); Theobald, 1926 : 169.
Macrosiphum (*Sitobion*) *luteum* (Buckton); Hille Ris Lambers, 1939 : 118.
Macrosiphum luteum (Buckton); Wolcott, 1948 : 155.
Sitobium (*Sitobium*) *luteum* (Buckton) Börner, 1952 : 164.
Macrosiphum (*Sitobium*) *luteum* (Buckton) Ossiannilsson, 1959 : 494.
Sitobion luteum (Buckton); Smith et al., 1963 : 88.
Macrosiphum (*Sitobion*) *luteum* (Buckton); Kloet & Hincks, 1964 (I) : 82.
Macrosiphum (*Sitobion*) *luteum* (Buckton); Eastop, 1966 : 458.
Macrosiphum(*Sitobion*) *luteum* (Buckton); Mamet, 1967 : 63.
Macrosiphum (*Sitobion*) *luteum* (Buckton); Ghosh & Raychaudhuri, 1968 : 184.

LECTOTYPE here designated: alate viviparous female. Surrey, Carshalton. Orchidaceae. 22.i.(year ?). (*Smee*). (*271**).

Paralectotypes: 1 apterous viviparous female, 1 nymph. Data as lectotype. (*271a**, *271b**).

Alate viviparous female. (Plate 5, fig. 63; Text-figs 36–40). *Colour* of macerated specimen: the insect shows signs of being teneral and is uniformly pale, with only very slight darkening of lateral abdominal sclerites, muscle-plates, siphunculi and femoral apices. *Morphology:* body about 2·5 mm long, slender, nearly three times as long as broad. Head smooth, antennal tubercles distinct but not prominent. Cephalic hairs sparse, up to 20μ long, with blunt or slightly expanded apices. Antennal segments I and II smooth except for a few scattered spinules on the ventral surface, remaining segments lightly imbricated; III with 12 and 16 circular secondary rhinaria arranged in line over a little more than three-quarters of the segment; antennal hairs blunt, short, reaching about 16μ on III, i.e. a little less than half its articular diameter; processus terminalis about 5·5 times as long as base of segment VI; the whole flagellum about equal to the body length; ratios of segments III to VI 56 : 53 : 47 : 15 + 85. Rostrum about 0·65 mm in length, apical segment bluntly triangular, 0·12 mm long, scarcely longer than



FIGS 36–40. *Macrosiphum* (*Sitobion*) *luteum* (Buckton). Lectotype: Fig. 36. Head, upper (left) and lower surfaces. Fig. 37. Antennal segments III–VI. Fig. 38. Apex of rostrum (penultimate segment fractured). Fig. 39. Siphunculus. Fig. 40. Cauda.

second segment of hind tarsus and with six non-apical hairs. Legs long and slender; hind femur about one-third of body length, with sparse, small, spiny hairs reaching 18μ in length; tibial hairs similar, more numerous, up to 30μ long. Fore tarsi missing; first segments of middle and hind tarsi each with three hairs. Three pairs of lateral abdominal sclerites are visible on segments II to V, each more or less oval, furnished with a few spinules and one small papilla; also present on each side are a small antesiphuncular sclerite and a large postsiphuncular sclerite. Paired muscle-plates occur on I–VI. Abdominal tergum smooth, hairs sparse, short—up to 18μ on the median area—blunt or with slightly expanded apices; eighth tergite with four hairs, the longest about 32μ. Siphunculi 0·45 mm long, broad at the base which is 3–4 times the narrowest diameter, and tapering towards the slightly flared apex; reticulated over the apical one-fifth to one-quarter, the remainder with a few imbrications and small groups of spinules. Cauda elongate, 0·25 mm long, slender, a little more than half as long as the siphunculi, with eight hairs.

Apterous viviparous female. This specimen, like the alata, has suffered in remounting, many of the appendages having become detached and some of their extremities lost. It appears to be more mature, with colour characters more pronounced, than the lectotype. Antennal segment III, except for its very base, is dark sclerotic, and the subsequent segments become progressively paler. Also dark sclerotic are the siphunculi and middle and hind femoral apices; the tibiae are paler. The characteristic oval, dark sclerotic patch on the abdominal dorsum between segments I and V shows clearly.

NOTES. Buckton describes the apterous viviparous female, nymph and alata. His manuscript notes give the date 22 January but add nothing further to his published data. In this instance his published figures render the colours and forms of his original sketches reasonably faithfully. His sketch of the alata, presumably drawn from life and perhaps from a specimen more mature than the lectotype, shows the siphunculi black, and the antennae, apices of femora and tibiae, and the tarsi dark.

He indicates what appear to be darkened muscle-plates but shows no lateral abdominal sclerites.

A full account of *luteum* is given by Hille Ris Lambers (1939 : 118).

Lachnus macrocephalus Buckton = ***Cinara pinicola*** (Kaltenbach)

Buckton, 1881 : 48; pl. 97, figs 1, 2.

LECTOTYPE here designated: alate male. West Sussex, Bramshott. *Picea abies*. Bred from nymph 26.vii.(year ?). (*274*).

Paralectotypes: 1 alate male, 1 nymph. Data as lectotype. (*274*).

BIOMETRIC DATA. Lectotype, alate male (abdomen shrivelled): body length 1·62 mm, antennal flagellum 0·96 mm, ratios of segments III–VI 56 : 21 : 22 : 21, siphuncular pore diameter 0·05 mm, basal diameter 0·21 mm, ultimate two rostral segments 0·27 mm, second segment of hind tarsus 0·32 mm, articular diameter of ant. seg. III 20μ, longest hair on ant. seg. III 80μ, on vertex 70μ, on hind femur 90μ, on hind tibia ±150μ.

Buckton describes the apterous viviparous female, nymph and alate male, but figures only the two latter morphs under the name *macrocephalus*. He records (p. 50) that apterae were sent to him from spruce at Walthamstow in June and that he found the same aphid in July at Bramshott, also on spruce. Winged males from the Bramshott sample matured on 26 July. His sheet of sketches contains drawings of an apterous female, ascribed to Walker and dated June 29, which I take to be one of

the Walthamstow specimens, and also sketches of an alate male and a nymph, described in his MS notes as 'numerous July 20 on the spruce fir, Bramshott'. The sketches of nymph and alata have been used for the figures of *macrocephalus* (figs 1 and 2), but the sketch of the aptera is used for figure 3, on the same plate, to illustrate *pini* L., and again for figure 1, plate 5, in his subsequent paper (Buckton, 1886) where he deals with the same species.

Buckton's original slide (*274*), labelled '*Lachnus macrocephala.* Bramshot.' (*sic*) contains two alate males, a nymph and an ovipara of *Cinara pinicola* (Kaltenbach). One of the alate males and the nymph are doubtless the models for the two figures of *macrocephalus*, but I strongly suspect that the ovipara has been made to play a double role. The close correspondence of its characters and measurements with the published description suggest that it formed the basis for the 'apterous viviparous female' of *macrocephalus*. At the same time its attitude closely resembles that of the sketch for figure 3, which is drawn on the same sheet with *macrocephalus* and was perhaps at first accepted by Buckton as that species, but a pencilled note beside it suggests that he changed his mind and later referred it to *pini* L. This, and its ascription to Walker, lead me to exclude this specimen from the type-series and to choose as lectotype an alate male from the Bramshott sample.

Chaitophorus maculatus Buckton = ***Therioaphis trifolii*** (Monell)

(Text-fig. 41)

Callipterus trifolii Monell, 1882 : 14.
Chaitophorus maculatus Buckton, 1899*b* : 277.
Callipterus genevei Sanborn, 1904 : 38.
Callipterus trifolii Monell; Davis, 1914*b* : 17.
[*Callipterus ononidis* (Kaltenbach) Theobald, 1915 : 134. Misidentification.]
Callipterus trifolii Monell; Das, 1918 : 244.
[*Therioaphis ononidis* (Kaltenbach); Theobald, 1927 : 364.]
[*Therioaphis ononidis* (Kaltenbach); Nevsky, 1929 : 316.]
[*Myzocallis ononidis* (Kaltenbach); Hottes & Frison, 1931 : 258.]
Myzocallis trifolii (Monell) Gillette & Palmer, 1931 : 892.
Myzocallis trifolii (Monell); Tseng & Tao, 1936 : 161.
Therioaphis collina Börner, 1942 : 273.
Pterocallidium maculatum (Buckton) Börner, 1949 : 49, 1952 : 63.
Pterocallidium lydiae Börner, 1949 : 49, 1952 : 63.
Pterocallidium propinquum Börner, 1949 : 49, 1952 : 63.
Pterocallidium trifolii (Monell) Quednau, 1954 : 35.
Therioaphis maculata (Buckton); Dickson et al., 1955 : 93.
Pterocallidium trifolii (Monell); Pintera, 1956 : 121.
Pterocallidium trifolii (Monell); Börner & Heinze, 1957 : 87.
Therioaphis (*Pterocallidium*) *maculata* (Buckton) Dickson, 1959 : 63.
Pterocallidium trifolii (Monell); Ossiannilsson, 1959 : 400.
Therioaphis trifolii (Monell); Hille Ris Lambers & van den Bosch, 1964 : 36–40.
Therioaphis trifolii (Monell); Richards, 1965 : 96.

LECTOTYPE here designated: apterous viviparous female. INDIA, Rajasthan,

Jodhpur, Marwar. *Medicago sativa*. vi.1897. (Collector ?). (Zoological Survey of India, Calcutta, no. 6765/H7(a).)

Paralectotypes: 3 apterous, 4 alate viviparous females, 3 larvae. Data as lectotype. (Z.S.I. nos 6765/H7(b, c), 6766/H7(a-c), 6767/H7(a-e).)

Apterous viviparous female. (Text-fig. 41). *Colour:* nearly all traces of pigmentation lost during storage. *Morphology:* body oval, 1·66–1·83 mm long, about twice as long as broad. Head smooth, antennal tubercles absent, median frontal tubercle prominent, situated between two rather slender, slightly capitate hairs 0·33 mm long; above these a pair of stouter hairs of the same length; vertex with two stout hairs anteriorly and four shorter ones in a line parallel with the posterior border of the head. Antennal segment I smooth with three fine, acute, very short (14μ) hairs; II smooth with one similar hair; III sparsely spinulose, slightly thickened on basal two-fifths part which bears 6–8 round or transversely oval rhinaria with thick rims. Hairs on III scarcely discernible, apparently acute, 8–10μ long, i.e. up to about half the articular diameter of the segment. No adult specimen among those examined has a complete antenna: that of a last-stage nymph (on same slide as lectotype) has length ratios of segments III–VI 100 : 59½ : 61 : 41½ + 40. Rostrum short, reaching only slightly beyond the fore coxae, apical segment 0·085 mm long, bluntly conical, about two-thirds as long as second segment of hind tarsus. Legs normal, except fore coxae which are very large, nearly 1½ times as wide at base as middle and hind coxae. Femoral hairs acute, short (12–16μ), tibial hairs acute, longer (35–40μ maximally). First tarsal segments with seven hairs, two dorsal and five ventral. Dorsal body hairs from about 35μ to 62μ long, the majority about 50μ, with stout cylindrical stem, apex expanded, fan-shaped in outline. Abdominal tergites with one pair each of spinal, pleural and marginal hairs; an accessory spinal hair is present on each of tergites I–V, giving seven hairs per tergite; VI has six hairs, VII has five, and VIII has four. Siphunculi short (0·05 mm), smooth, without flange. Cauda 0·15–0·19 mm long, knob oval, with 9–12 hairs.

Alate viviparous female. Colour: all pigment lost except in lateral abdominal sclerites, which are brownish, and the stigma of the fore wing, which shows faint traces of pigmentation.

Morphology: similar to aptera, but dorsal body hairs shorter; of those that are present and measurable, most are about half as long as the corresponding hairs in the aptera. Lateral sclerites present on abdominal segments II–V, rounded, slightly protuberant, those on II scabrous, wart-like. Antennal segment III with 6–8 secondary rhinaria on basal part, occupying from 0·42 to 0·44 of its total length.

NOTES. The morphological similarities between *maculata* Buckton and the yellow clover aphid, *Therioaphis trifolii* (Monell), are so close that most authors from Davis (1914) onwards have regarded the two species as identical. Dickson (1959), however, found characters by which he could separate populations of yellow clover aphid (YCA) on *Trifolium* spp. from populations of what had come to be known as spotted alfalfa aphid (SAA) on *Medicago* spp. in North America, and proposed that the latter aphid should be called *maculata* Buckton. The two characters which Dickson used to distinguish SAA from YCA were the area of the third antennal segment occupied by secondary rhinaria (less than half in SAA, more than half in YCA), and the presence (in SAA) or absence (in YCA) of dark sclerotic 'dashes' on the underside of the abdomen. Miss L. M. Russell, who had examined some of Buckton's type material from Calcutta, confirmed, in a letter quoted by Dickson (1959), that the sensoriation of antennal segment III in *maculata* agreed with that of North American SAA, and comparison of the ventral sclerotization showed that the 'dashes', though much bleached from long storage, were present but smaller and narrower than those of North American specimens. In the lectotype and paralectotypes of *maculata*, which

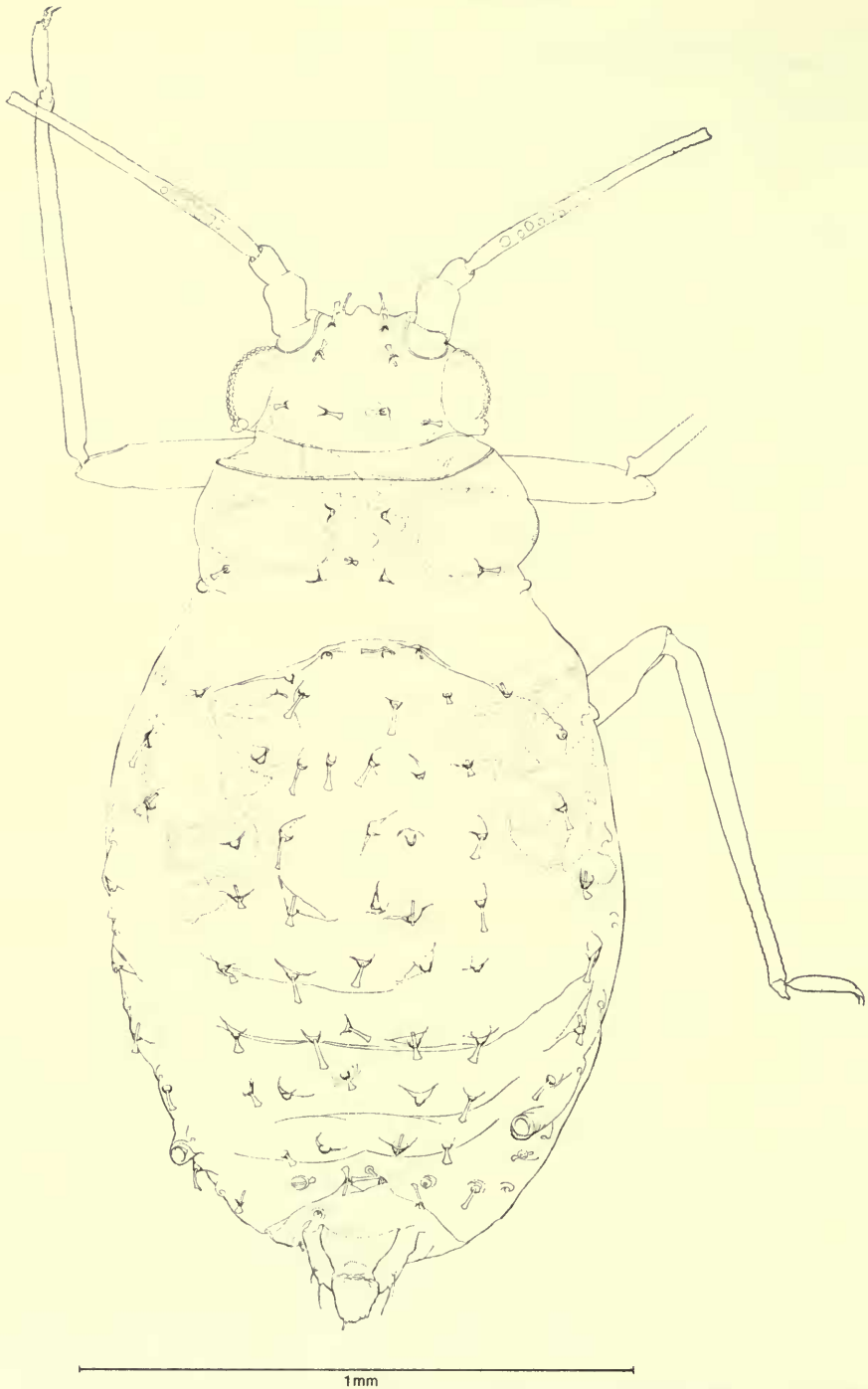


FIG. 41. *Therioaphis trifolii* (Monell) (*maculata* Buckton). Lectotype: whole insect to show dorsal chaetotaxy, etc. (Right fore tibia and tarsus and smaller hairs omitted.)

I have examined but which Miss Russell did not see, the sensoriation of antennal segment III agrees with the specimens she did examine and with Dickson's SAA, but in none can I discern any sign of ventral 'dashes', even in alatae. This does not prove their absence, but could be due partly to bleaching and partly to many of the finer cuticular structures being obscured by contained embryos.

Hille Ris Lambers and Van den Bosch (1964) sum up our present knowledge on this subject in the light of information gained from breeding and transfer experiments. They conclude that although Dickson's characters are valid for separating YCA and SAA in North America, where the entire populations of both aphids may each have sprung from single introduced individuals or clones, these differences fall well within the normal limits of variability of *trifolii* alone in other parts of the world. YCA and SAA are thus merely two varieties of *trifolii* Monell, under which name *maculata* Buckton falls as a synonym.

Hyalopterus melanocephalus Buckton = ***Hayhurstia cucubali*** (Passerini)

Aphis cucubali Passerini, 1863 : 170, *nec* Linnaeus, 1746 : 218.
Aphis silenea Ferrari, 1872*a* : 72.
Hyalopterus melanocephalus Buckton, 1879 : 116; pl. 77, figs 5–7.
Hyalopterus melanocephalus Buckton; Theobald, 1927 : 30.
Semiaphis cucubali (Passerini) Hille Ris Lambers, 1934 : 25.
Brachycolus melanocephalus (Buckton) Hille Ris Lambers, 1950 : 41.
Hayhurstia cadiva (Walker) Börner, 1952 : 109.
Hayhurstia cucubali (Passerini) Kloet & Hincks, 1964 (I) : 76.

LECTOTYPE here designated: apterous viviparous female. Norfolk, Norwich, Brandon. *Silene cucubalus* (syn. *inflata*). 13.viii.(year ?). (*Barrett* ?). (*283*).

Paralectotypes: 1 apterous viviparous female, 2 nymphs, 2 larvae. Data as lectotype. (*283*). 5 apterous, 2 alate viviparous females. Surrey, Haslemere, Weycombe. *Silene cucubalus*. vii.(year ?). (*Buckton*). (*282**).

Biometric data. Lectotype, aptera: body length 1·50 mm, antennal flagellum 0·64 mm, ratios of segments III–VI 25 : 11 : 12 : 11 + 21, siphunculus 0·06 mm, cauda 0·14 mm, caudal hairs 7, ultimate rostral segment 0·08 mm, second segment of hind tarsus 0·12 mm, eighth tergite with 5 (?) hairs, articular diameter of ant. seg. III 16μ, longest hair on ant. seg. III 10μ, on hind femur 16μ, on hind tibia 30μ, on eighth tergite 26μ.

Buckton records *melanocephalus* from Haslemere and Brandon, near Norwich. His manuscript notes indicate that he received the Brandon material first, and took from it an aptera and a nymph as models for figures 5 and 6. These are dated 13 August, and the specimens were probably collected by Barrett. Buckton's description and sketch of the alata are based on specimens he took subsequently at Haslemere. All his material is *cucubali* Passerini.

Siphonophora menthae Buckton = ***Aulacorthum solani*** (Kaltenbach)

Buckton, 1876 : 120; pl. 9, figs 1, 2.

LECTOTYPE here designated: apterous viviparous female. Surrey, Haslemere. *Mentha spicata* (syn. *viridis*). vii.(year ?). (*Buckton*). (*284d**).

BIOMETRIC DATA. Lectotype, aptera: body length 2·60 mm, antennal flagellum not measurable (both processi incomplete), ratios of segments III–V 30 : 25 : 16 : ?, secondary rhinaria on III 2 and 1, siphunculus 0·64 mm, cauda 0·25 mm, caudal hairs 7, ultimate rostral segment 0·15 mm, second segment of hind tarsus 0·13 mm, eighth tergite with 6 hairs, articular diameter of ant. seg. III 40μ, longest hair on ant. seg. III 10μ, on hind femur 18μ, on hind tibia 40μ, on eighth tergite 40μ.

Buckton's original slide of *menthae* contained two alatae and two larvae of *Ovatus crataegarius* (Walker), an alate *Myzus persicae* (Sulzer), and an apterous *Aulacorthum solani* (Kaltenbach), all now remounted. He describes and figures the apterous and alate viviparous females of *menthae*. Both the figure of the aptera (fig. 1) and Buckton's original sketch on which it is based show an aphid of form and colouring typical of *Aulacorthum solani*, and I have little doubt that the aptera from his slide is his type of the aptera of *menthae*. There is less certainty about the identity of the alata he described and figured, but there are indications pointing to its being *persicae* rather than *crataegarius*. The original sketch shows a predominantly green aphid with black antennae, siphunculi and lateral abdominal sclerites. The antennae are about the right proportionate length for *persicae*, the cauda is pale, and the siphunculi are slightly but distinctly clavate. The abdomen, however, is without the dark dorsal patch and transverse bands characteristic of *persicae*. The published description, however, does mention 'some specimens' with 'disjointed transverse bars on the abdomen'.

Subsequent authors have not unnaturally assumed that when he described *menthae* Buckton had before him the small pale aphid found on mint that Walker (1850) first described as *crataegarius* (and later (1852) also as *menthae* and *melissae*). This assumption is supported by Theobald (1926 : 279), who knew that Buckton's slide contained *crataegarius* and who noted that it also contained an alate *persicae* and 'an apterous female *Myzus* sp.' (i.e. *solani*), but did not associate the latter two with Buckton's description and figures. Hille Ris Lambers was aware that Buckton's type of the apterous *menthae* was *solani*, and informed M. D. Leonard, who quoted the information in his paper on the distribution and habits of the mint aphid (Leonard, 1963 : 55). Kloet & Hincks (1964 (I) : 80) list *menthae* Buckton as a synonym of *solani* Kaltenbach.

Siphonophora muralis Buckton = ***Dactynotus muralis*** (Buckton)

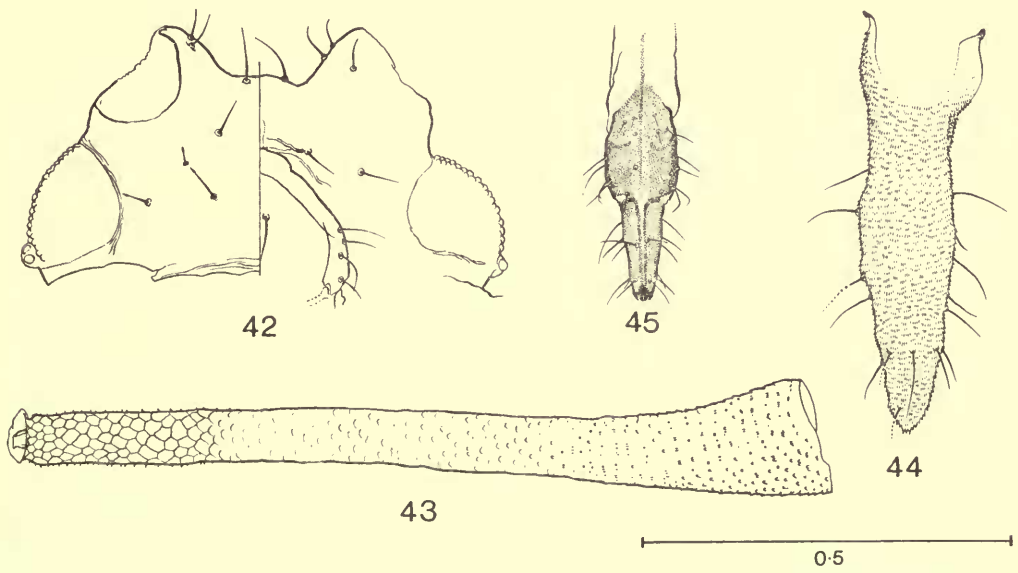
(Pl. 5, fig. 64; Text-figs 42–45)

Siphonophora muralis Buckton, 1876 : 157; pl. 26, figs 1–4, 7.
Macrosiphum muralis (Buckton) Theobald, 1913 : 70, 1926 : 91.
Dactynotus muralis (Buckton) Hille Ris Lambers, 1939 : 26.
Dactynotus muralis (Buckton); Börner, 1952 : 171.
Dactynotus muralis (Buckton); Ossiannilsson, 1959 : 503.
Dactynotus muralis (Buckton); Heie, 1960 : 194, 206.
Dactynotus muralis (Buckton); Tashev, 1964 : 163.

LECTOTYPE here designated: apterous viviparous female. Surrey, Haslemere, Weycombe. *Mycelis* (syn. *Lactuca*) *muralis*. 30.vi.(year ?). (*Buckton*). (*288a**).

Paralectotypes: 2 alate viviparous females, 1 nymph, 1 larva. Data as lectotype. (*288b*, c*, d*, 289*).

Apterous viviparous female. (Plate 5, fig. 64; Text-figs 42–45). (Description based on type only, an unusually large aptera with alatiform antennal sensoriation.) *Colour* of macerated specimen: head, rostrum most of antennae, pronotum and siphunculi dark brown. A large area on the mesonotum, the abdominal scleroites, anal and subgenital plates brown; apices of femora and tibiae, and the tarsi, more or less darkened. Remainder of body and appendages, including whole of cauda, pale. *Morphology:* body elongate-oval, 3·96 mm long, rather more than twice as long as broad. Head smooth with prominent antennal tubercles, dorsal hairs slender, with swollen apices, the longest reaching 55μ. Antennal flagellum 0·9 of body length, ratios of segments III–VI 89 : 74 : 69 : 19 + 100; antennal hairs spiny, blunt, up to 40μ long, not quite equal to articular diameter of third segment, which carries 40 rather small, round, secondary rhinaria distributed over nearly its whole length; fourth segment with 6 and 7 rhinaria; processus terminalis five times as long as base of sixth segment. Rostrum reaching to, or only slightly beyond, middle coxae, apical segment short (0·14 mm), blunt, with 8 non-apical hairs. Legs long and slender, hind femur with rather sparse hairs, variable in length, the longest about 48μ; tibial hairs similar, reaching 50μ. First segments of tarsi with 5 hairs on all legs; second segment of hind tarsus 0·20 mm long. The dorsal abdominal hairs are nearly all carried singly on small scleroites; the spinal hairs are duplicated on the anterior segments where their maximal length reaches about 45μ; small lateral tubercles, each carried on a hair-bearing scleroite, are present on segments II–IV, or II–V; antesiphuncular sclerites are absent. Eighth tergite with 4 hairs, the longest about 70μ. Subgenital plate with 9 hairs along its posterior margin. Siphunculi 1·09 mm long, about one-quarter of the length of the body, cylindrical except for the expanded base, apical one-quarter reticulated, remainder lightly imbricated, flange small. Cauda 0·55 mm long, ensiform, slender, about three times as long as its basal width and half as long as the siphunculi, with 15 hairs.



Figs 42–45. *Dactynotus muralis* (Buckton). Lectotype: Fig. 42. Head, upper (left) and lower surfaces. Fig. 43. Siphunculus. Fig. 44. Cauda. Paratype, alata (*288b*): Fig. 45. Apex of rostrum.

NOTES. Buckton describes and figures the apterous and alate viviparous females, the nymph, the alate male and the ovipara. The descriptions and figures of the first three morphs relate to *muralis;* those of the 'male' appear to be based on one of five alate females of *Myzus persicae* (Sulzer), which are included among Buckton's material of *muralis*, while the sketch of the 'ovipara' resembles a young larva of *muralis* present on *289*. His manuscript notes give the date as 30 June.

Pemphigus napaeus Buckton

Buckton, 1896 : 50.

Lectotype (designated by Doncaster, 1969 : 160): alate viviparous female, fundatrigenia. INDIA, Kashmir, Darkot Pass. c. 3,000 m. *Populus* sp. galls. (Date of collection and collector not known). (*292**).

Paralectotypes: fundatrix, nymph, 6 alate viviparous females. Data as lectotype. (*290**, *291**, *291a**, [*292a**], *293**, *294**).

I have already given an account of *napaeus* Buckton elsewhere (Doncaster, 1969 : 160). All the type material is in the BMNH except one alate fundatrigenia (*292a*) which is in the collection of Mr D. Hille Ris Lambers of Bennekom, Netherlands.

Siphonophora olivata Buckton = ***Dactynotus cirsii*** (Linnaeus)

Aphis cirsii Linnaeus 1758 : 452, Goeze, 1778 : 299, Gmelin, 1790 : 2205.
Aphis serratulae Kaltenbach, 1843 : 25.
[*Aphis sonchi* Linnaeus; Walker, 1848*a* : 197 partim. Misidentification.]
[*Siphonophora cichorii* Koch; Buckton, 1876 : 163 partim ? Misidentification.]
Siphonophora olivata Buckton, 1876 : 164; pl. 29, figs 3, 4.
Macrosiphum githargo Theobald, 1926 : 84 ?
Dactynotus marcatus Hille Ris Lambers, 1931*a* : 170.
Dactynotus olivatus (Buckton) Hille Ris Lambers, 1933 : 170.
Dactynotus cirsii (L.) Hille Ris Lambers, 1939 : 18.
Dactynotus cirsii (L.); Börner, 1952 : 170.

LECTOTYPE here designated: alate viviparous female. West Sussex, Linchmere. *Cirsium vulgare* (syn. *Carduus lanceolatus*). 14.viii.(year ?). (*Buckton*). (*298a**).

Paralectotypes: 2 apterous, 1 alate viviparous females. Data as lectotype. (*298b**, *c**, *d**).

BIOMETRIC DATA. Lectotype, alata: body length not measurable (that of paralectotype *298b* is 4·20 mm), antennal flagellum not measurable (both processi incomplete), ratios of segments III–base VI 59 : 45 : 39 : 9 + ?, secondary rhinaria on III 74, siphunculus 1·30 mm, cauda 0·68 mm, caudal hairs 27, ultimate rostral segment 0·25 mm, second segment of hind tarsus 0·21 mm, eighth tergite with 6 hairs, articular diameter of ant. seg. III 52μ, longest hair on ant. seg. III 50μ, on hind femur 65μ, on hind tibia 65μ, on eighth tergite 120μ.

Buckton describes and figures the apterous and alate viviparous females, collected on the flower stems of *Carduus lanceolatus* (now *Cirsium vulgare*) at Linchmere,

Sussex, in mid-August. There were originally two slides named *olivata*, one (*297*) containing apterae and larvae of *Dactynotus cirsii* (L.) and labelled '*Carduus arvensis*. Aberdeen.', and another (*298*) with two apterous and two alate females, also of *cirsii*, from Linchmere. Buckton's manuscript notes accompanying his sketches of *olivata* refer only to the Linchmere sample and give the date 14 August. There is no mention of specimens from Aberdeen. I assume therefore that his description and figures relate only to the specimens on *298*. These could provide a model for the alate *olivata*, of which the characters given are consistent with those of *cirsii*, but not for the aptera, which Buckton describes and figures as having a black cauda, and the published measurements of which are too small for either of the apterae on *298* (or, for that matter, any of those in the Aberdeen sample). Buckton probably used for his model an aptera of another species which has since been lost.

Theobald (1913 : 79, 1926 : 82), who redescribes the species as *Macrosiphum olivatum*, also states that the cauda of the aptera is black, but adds the observation (1926 : 84) that the cauda is black in the larva but pale at the base in the adult. He also found one colony in which the cauda in adult apterae was almost entirely black. This suggests that he had encountered a colony of *Uromelan aenaeus* Hille Ris Lambers and provides a possible clue to the identity of Buckton's aptera. (Buckton's sketch, moreover, may have been made from a larva: the cauda is too small for a typical adult, and this would account for the small dimensions given in his published account.) Börner (1952 : 170, 172) comes to the same conclusion, and includes *olivata* as a synonym partly of *cirsii* and parly of *aenaeus*. Kloet & Hincks (1964 : 82, 83) do likewise.

Aphis opima Buckton = ***Brachycaudus cardui*** (L.)

Buckton, 1879 : 101; pl. 71, figs 1–4.

LECTOTYPE here designated: apterous viviparous female. Surrey, Haslemere, Weycombe. *Cineraria*, in greenhouse. Undated. (*Buckton*). (*301*).

Paralectotypes: 4 apterous viviparous females, 3 larvae. Data probably as lectotype. (*299, 301*). 2 apterous viviparous females, 1 larva. Data as lectotype, but dated December. (*303*). 2 apterous, 3 alate viviparous females. Sussex, Chichester. *Cineraria*, in greenhouse. 3.vi.(year ?). (*302*).

Biometric data. Lectotype, aptera: body length 2·10 mm, antennal flagellum 1·32 mm, ratios of segments III–VI 49 : 32 : 24 : 13 + 49, siphunculus 0·27 mm, cauda 0·11 mm, caudal hairs 5 (?), ultimate rostral segment 0·19 mm, second segment of hind tarsus 0·13 mm, eighth tergite with 7 hairs, articular diameter of ant. seg. III 28μ, longest hair on ant. seg. III 10μ, on hind femur 20μ, on hind tibia 50μ, on eighth tergite 80μ.

Buckton describes and figures the apterous and alate viviparous females which he took on *Cineraria* in greenhouses. There are four slides named *opima* by him (*299, 301, 302, 303*), containing several apterous and alate *Brachycaudus cardui* (L.) and a few *Myzus persicae* (Sulzer). Buckton's description of the aptera of *opima* includes an account of the later larval stages while the insect is still green, and one of these he illustrates in figure 1 (though calling it in the caption 'green variety of

apterous female'). Figure 2 shows the fully adult aptera with its dark pigmentation. These figures and that of the alata (fig. 3) are all consistent with the characters of *cardui* and can be matched with specimens of *cardui* on *299*, *301* and *302*. There is, however, no extant specimen of an early-stage larva which corresponds to the uncoloured sketch used in figure 4.

Buckton records *opima* from Haslemere, Chichester and Wanstead. His notes and slide labels suggest that the apterae he described and figured came from his own greenhouse at Weycombe (April-September, 3 October, 30 November), the alatae were from Chichester (3 June), and a slide of Walker's, unnamed and labelled 'Cineraria. Walk., No. 2', which contains *Myzus persicae*, perhaps represents the Wanstead record.

Theobald (1927 : 287) includes *opima* Buckton in *Anuraphis* and quotes Buckton's description in full. He mentions Buckton's specimens (on five slides, now numbers *299–303*), which Laing had correctly identified as *cardui* and *persicae*, and concludes that Buckton's description of *opima* 'fits *cardui* perfectly well'. But Theobald mistakenly ascribes Buckton's figures of the immature aptera (fig. 1) and the adult alata (fig. 3) of *opima* to *persicae*. Even in the reproduced figures the form and proportions of cauda and siphunculi alone would rule this out, while the original sketches show the typical macroscopic characters of *cardui* even more clearly and leave no room for doubt.

Börner (1952 : 104) places *opima* as a synonym of *cardui*, as do Kloet & Hincks (1964 : 75).

Aphis pedicularis Buckton = ***Aphis nasturtii*** Kaltenbach

Aphis nasturtii Kaltenbach, 1843 : 76.
Aphis transiens Walker, 1849*b* : xliv.
Aphis rhamni Koch, 1854 : 119, nec Boyer de Fonscolombe, 1841 : 177.
[*Aphis acetosae* F.; Koch, 1855 : 145. Misidentification.]
Aphis pedicularis Buckton, 1879 : 41; pl. 48, figs 4, 5.
Aphis polygoni van der Goot, 1912 : 80, nec Walker, 1848 : 2249.
Aphis abbreviata Patch, 1912 : 170.
Aphis acetosella Theobald, 1918 : 286
[*Aphis solanina* Passerini; Theobald, 1919 : 161. Misidentification.]
Aphis githaginella Theobald, 1927 : 168.
Aphis neopolygoni Theobald, 1927 : 160.
Aphidula nasturtii (Kaltenbach) Börner, 1952 : 79.

LECTOTYPE here designated: apterous viviparous female. Norfolk, fens. *Pedicularis palustris*. 14.vii.(year ?). (Collector not stated, perhaps *Barrett*). (*312a**).

Paralectotypes: 5 apterous viviparous females. Data as lectotype. (*312*).

Biometric data. Lectotype, aptera: body length 2·13 mm, antennal flagellum 0·90 mm, ratios of segments III–VI 29 : 21 : 19 : 14 + 29, siphunculus 0·28 mm, cauda 0·20 mm, caudal hairs 7, ultimate rostral segment 0·11 mm, second segment of hind tarsus 0·10 mm, eighth tergite with 2 hairs, articular diameter of ant. seg. III 22μ, longest hair on ant. seg. III 14μ, on hind femur 45μ, on hind tibia 45μ, on eighth tergite 45μ.

Buckton describes and figures only the apterous viviparous female and young

larva. The single slide, named *pedicularis* in Buckton's hand, contained six adult apterae of what I take to be *Aphis nasturtii* Kaltenbach. His original sketch records rather skilfully the rounded shape, yellow-green colour and matt-textured skin characteristic of this aphid.

Endeis pellucida Buckton = ***Geoica eragrostidis*** (Passerini)

Buckton, 1883 : 91; pl. 129, figs 2, 4.
(For synonymy, see *carnosa*, p. 41.)

LECTOTYPE here designated: apterous viviparous female. Kent, Beckenham, in ants' nest. ii.1876 (or 7.ii.1879). (*Lubbock*). (*89**).

BIOMETRIC DATA. Lectotype, aptera: body length 1·26 mm, whole antenna 0·40 mm, ratios of antennal segments I–IV 8 : 9 : 20 : 13, ultimate rostral segment 0·16 mm, second segment of hind tarsus 0·10 mm.

The viviparous female is described and Buckton's notes on the sheet of sketches indicate that his specimen was one of those sent by Lubbock from ants' nests. Two dates are written beside the sketch of *pellucida:* February, 1876, and 7 February, 1879, without indication as to which applies. Of five specimens labelled *pellucida* by Buckton, that which best fits his description, notes and figures is the larger of two apterous *Geoica eragrostidis* (Passerini) on *89*, and this I believe to be his type. It differs from the type of *carnosa* (which is also *eragrostidis*) in having acute instead of flabellate hairs.

Theobald (1929 : 197) refers to what he believed was Buckton's type of *pellucida*, but he quotes the label of *317*, the two specimens on which, though both *eragrostidis*, agree less closely with Buckton's data than the one I have chosen on *89*. Moreover, the label of *89* and Buckton's sketch of *pellucida* are both marked '$\frac{F}{X}$ No. 1'.

None of the specimens named *pellucida* has antennae 'with five nearly equal joints', as Buckton says in his description, and shows in his sketch and figure 4.

Aphis penicillata Buckton = ***Aphis grossulariae*** Kaltenbach

Aphis grossulariae Kaltenbach, 1843 : 67. [No type exists.]
Aphis penicillata Buckton, 1879 : 51; pl. 51, figs 5, 6. **Syn. n.**
Aphis penicillata Buckton; Theobald, 1927 : 212.
Aphidula grossulariae (Kaltenbach) Börner, 1952 : 78.

LECTOTYPE here designated: apterous viviparous female. Pembroke. *Epilobium montanum.* vii.(year ?). (Collector not stated, perhaps *Barrett*). (*163**).

Paralectotypes: 4 apterous, 4 alate viviparous females. Data as lectotype. (*163a**, *b**, *c**).

BIOMETRIC DATA. Lectotype, aptera: body length 1·92 mm, antennal flagellum 0·88 mm, ratios of segments III–VI 26 : 19 : 19 : 14 + 32, siphunculus 0·30 mm, cauda 0·22 mm, caudal hairs 12, ultimate rostral segment 0·16 mm, second segment of hind tarsus 0·10 mm, eighth tergite with 2 hairs, articular diameter of ant. seg. III 20μ, longest hair on ant. seg. III 30μ, on hind femur 55μ, on hind tibia 60μ, on eighth tergite 50μ, marginal tubercles present on abd. segs I–IV and VII, I–III and VII.

Paralectotype alata: body length 2·30 mm, ant. flag. 1·18 mm, ratios segs III–VI 40 : 26 : 24 : 18 + 39, secondary rhinaria on III 11, on IV 4, on V 1, siph. 0·30 mm, cauda 0·21 mm, caudal hairs 13, ult. rost. seg. 0·14 mm, second seg. hind tarsus 0·10 mm, eighth tergite with 2 hairs, artic. diam. ant. seg. III 20μ, longest hair on ant. seg. III 32μ, on hind femur 50μ, on hind tibia 50μ, on eighth tergite 60μ, marginal tubercles present on abd. segs I–V and VII, I–III and VII.

Buckton describes the apterous and alate viviparous females from specimens taken at Pembroke in July and subsequently at Haslemere. I believe his types of *penicillata* to be five apterae and four alatae of *Aphis grossulariae* Kaltenbach originally mounted on *163*, which was at first labelled simply 'Epilobium. Pembroke. $\frac{L}{S}$.' in Buckton's hand, and later named '*Aphis epilobii* (81)D.C. $\frac{B}{N}$.' on one of Buckton's typewritten labels. ($\frac{B}{N}$ occurs on other slides named *epilobii*.) Buckton's original sketches of *penicillata*, entitled 'Epilobium. Pembroke. July. $\frac{L}{S}$.' show a rather yellowish green aptera with pale yellow-brown appendages, and an alata with black head, thorax, antennae, femora and tibial apices, and a dark green abdomen with clearly defined marginal tubercles, which are mentioned also in the text. These characters are consistent with the mounted specimens, the apterae of which have the unpigmented head, stigmal plates and cauda, as well as marginal tubercles on many of the abdominal segments, characteristic of *grossulariae*.

Theobald (1927 : 212) quotes Buckton's original description in full and mentions a Buckton slide of specimens he had seen and believed to be *penicillata*, and of which he adds some details. This slide is *318*, which contained seven alatae and three nymphs, but no apterae, of *Aphis grossulariae* Kaltenbach (now remounted) and had been tentatively named '? *penicillata*' by Laing. The original slide apparently carried no data except the code $\frac{B}{U}$ and another, partly obliterated, which Theobald interpreted as $\frac{L}{I}$. $\frac{B}{U}$ occurs elsewhere only on slides named by Buckton *urticaria*, which contain a mixture of *urticata* F. and *confusa* Walker. The fact that *penicillata* follows *urticaria* in the monograph and the two are figured on the same plate may have led Laing to conclude that these specimens were the types of *penicillata*. I cannot disprove his conclusion, but prefer to regard as Buckton's types the specimens on *163*, which carries data that link them with his sketches and also includes adult apterae, which are absent from *318*. Buckton recognizes (1879 : 72) that *penicillata* is distinct from his concept of *epilobii* Kaltenbach, which he appears to have based on a mixture of *epilobiaria* Theobald and *praeterita* Walker, and I think it likely that, having described and figured the specimens on *163* as *penicillata*, he omitted to alter the name on the label.

Aphis petasitidis Buckton = ***Brachycaudus helichrysi*** (Kaltenbach)

Buckton, 1879 : 69, pl. 58, figs 1, 2.

LECTOTYPE here designated: alate viviparous female. Northumberland, Holy Island. *Cynoglossum* or *Pyrethrum*. 1.vii.(year ?). (*Hardy*). (*332*).

Paralectotypes: 2 apterous, 4 alate viviparous females, 3 larvae. Data as lectotype. (*332*). 8 alate viviparous females, 7 nymphs, 1 larva. East Hertfordshire, Albury. *Petasites hybridus*. 15.vi.(year ?). (Collector not stated). (*331*, *333*).

BIOMETRIC DATA. Lectotype, alata: body length 1·60 mm, antennal flagellum 1·12 mm, ratios of segments III–VI 45 : 27 : 17 : 12 + 41, secondary rhinaria on III 20, on IV 2, on V 0, siphunculus 0·14 mm, cauda 0·09 mm, caudal hairs 6, ultimate rostral segment 0·13 mm, second segment of hind tarsus 0·12 mm, eighth tergite with 7 hairs, articular diameter of ant. seg. III 18μ, longest hair on ant. seg. III 14μ, on hind femur 20μ, on hind tibia 30μ, on eighth tergite 80μ.

The adult aptera, nymph and alata are described, but only the nymph and alata figured. The hosts are given as *Tussilago petasites* (now *Petasites hybridus*) and *Cynoglossum officinale*, and the localities Albury, Herts, and Holy Island, Northumberland. Of the three slides labelled *petasitidis* by Buckton, two (*331*, *333*) contain specimens from the Albury sample, and the third (*332*) aphids from Holy Island. The label on the last records two hosts, *Cynoglossum* and *Pyrethrum*. Of the total of 28 specimens, all but two accidental inclusions are *Brachycaudus helichrysi* (Kaltenbach).

Buckton records in his notes and in the text that the alata he figured gave birth to two young while under the microscope. An alata in the Holy Island sample shows some similarities in attitude with Buckton's sketch, and the slide includes some young larvae. It seems likely that this is his type of the alate *petasitidis* and I choose it as lectotype. Though both sketch and published figure show the siphunculi as considerably longer than those of *helichrysi*, the measurement Buckton gives for siphuncular length is more nearly typical, i.e. 0·17 mm, or about one-eighth of the body length. In the lectotype this proportion is about one-tenth.

Glyphina pilosa Buckton = ***Schizolachnus pineti*** (Fabricius)

Buckton, 1883 : 16; pl. 116, figs 1–4.
(For synonymy, see *fuliginosa*, p. 57.)

LECTOTYPE here designated; alate viviparous female. Surrey, Haslemere, Meadfields. *Pinus sylvestris*. 29.vii.(year ?). (*Buckton*). (*4*).

Paralectotypes: 1 alate, 2 apterous viviparous females, 1 nymph. Surrey, Haslemere, Weycombe. *Pinus sylvestris*. 29.vii.1874 ? (*Buckton*). (*3*). 1 alate, 1 apterous viviparous female ('*pineti*' in Walker's hand). Middlesex, Southgate. *Pinus sylvestris*. 25.vi.1847. (*Walker*). (*W.653*).

BIOMETRIC DATA. Lectotype, alata: body length 1·44 mm, antennal flagellum 0·74 mm, ratios of segments III–VI 43 : 15 : 18 : 17, secondary rhinaria on III 7, siphuncular pore diameter 0·06 mm, ultimate rostral segment 0·12 mm, second segment of hind tarsus 0·25 mm, articular diameter of ant. seg. III 18μ, longest hair on ant. seg. III 100μ, on hind femur 180μ, on hind tibia 180μ.

Paralectotype aptera: body length 1·76 mm, ant. flag. 0·76 mm, ratios of segs III–VI 43 : 18 : 18 : 18, siph. pore diam. 0·08 mm, ult. rost. seg. 0·14 mm, second seg. hind tarsus 0·29 mm, artic. diam. ant. seg. III 34μ, longest hair on ant. seg. III 140μ, on hind femur 170μ, on hind tibia 190μ.

Buckton describes the apterous and alate viviparous females, but figures the larva and alata. The specimens, his own from Haslemere, and others sent him by Walker from Southgate, were taken from *Pinus sylvestris*. There are no slides named

Glyphina pilosa, but two of Buckton's slides, and one of Walker's in Buckton's collection, all named *Mindarus abietinus* by Buckton, contain specimens of *Schizolachnus pineti* (F.) from *Pinus sylvestris* at Weycombe, Meadfields (both near Haslemere) and Southgate, and are believed to be the types of *pilosa*.

Buckton evidently thought at first that these specimens were *Mindarus abietinus* Koch, but changed his opinion when he found that in the fore wings of his alatae the media was apparently unbranched. This ruled out *Mindarus* and led him to erect *pilosa* as a new species in *Glyphina*. In one of his three alatae (that on slide *4*) the media is indeed simple, but in that on *3* the branch is discernible though very faint. Walker's alata (*W.653*) has one fore wing crumpled but in the other the proximal branch of the media cannot be seen. Buckton's original sketch of the alata shows the fore wings each with unbranched media, but alongside is drawn a wing with branched media and the note 'very faint in some specimens'. This wing is not reproduced on plate 116, and in his published description Buckton states unequivocally that the media (he calls it the cubital) is unforked, and believes Walker to be mistaken in supposing—correctly—that the aphid is *pineti*.

I choose as lectotype the alata on *4*, a rather small specimen which agrees better with the published measurements than the others, and is likely to be the one used for figure 2.

Theobald in a footnote (1929 : 81) quotes Laing's opinion, supported by that of Swain (1921 : 212), that Buckton's specimens named *Mindarus abietinus* are *pineti* F. and likely to be the types of *pilosa*. Subsequent authors have accepted this conclusion. Börner (1952 : 40) remarks that individuals of *pineti* with the media unbranched in one or both fore wings occur as aberrations.

Pterocomma pilosum Buckton

(Pl. 6, fig. 65; Text-figs 46–50)

Buckton, 1879 : 143; pl. 83, figs 1–5.

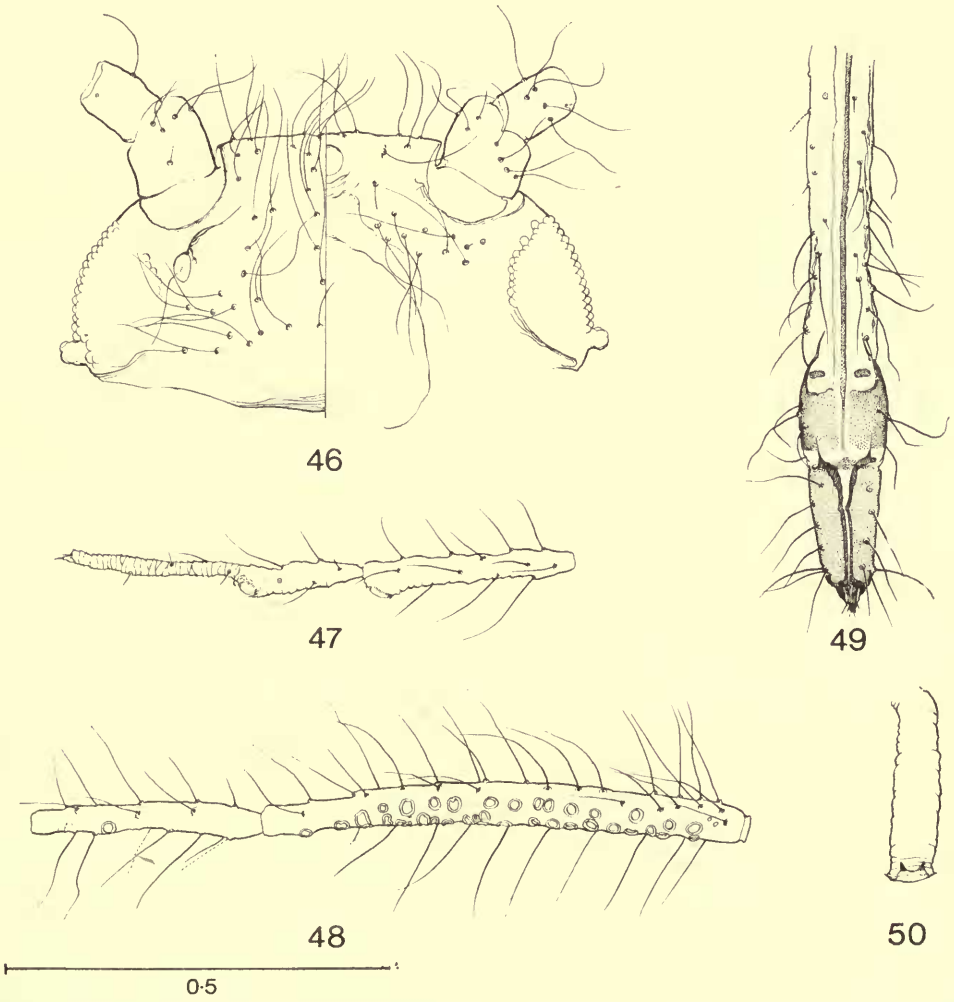
(The taxonomy of the genus *Pterocomma* is so confused that I prefer not to attempt a synonymy of *pilosum* Buckton. A recent review of the Tribe Pterocommatini Mordvilko is that of Szelegiewicz (1965).)

LECTOTYPE here designated: alate viviparous female. London, Kentish Town. *Salix* sp. twigs. 28.ix.(year ?). (*Knaggs*). (*342**).

Paralectotypes: 5 larvae, 1 nymph. Data as lectotype. (*343*).

Alate viviparous female. (Plate 6, fig. 65; Text-figs 46–50.) (Description based on lectotype only.) *Colour* of macerated specimen: mostly pale brownish, with the heavily sclerotized parts, e.g. pterothorax, anal plate, knees, rather darker. The dark sclerotic transverse bands shown in the figure are scarcely discernible. *Morphology:* body large and thick, 3·04 mm long, 1·06 mm broad (I accept Buckton's measurements here, because the specimen has become unnaturally elongated by pressure in remounting). Head with numerous fine, acute hairs up to 170μ long. Antennal flagellum 1·52 mm, i.e. about half the length of the body, ratios of segments III–VI 60 : 30 : 26 : 16 + 21, antennal hairs rather numerous, fine, acute, long (up to 40μ) except on VIth segment, which has seven hairs up to about 90μ on the base and, on the processus, 4–5

much shorter hairs in addition to the 3–4 terminal sensillae. Second antennal segments each with five hairs. Third segments with 37 and 34 rather large, circular secondary rhinaria, mostly on the postero-ventral surface, the fourth with 1 and 2. Rostrum (detached from specimen; total length not measurable) with ultimate segment broad, tapering only slightly towards apex, 0·20 mm long, slightly longer than second segment of hind tarsus (0·18 mm), with 9 non-apical hairs in two lateral rows. Legs stout with numerous fine hairs, the longest reaching 150μ on the hind femora and 165μ on the hind tibiae. First tarsal segments on all legs with 5 hairs. Abdomen densely clothed with fine hairs, the longest reaching from 170μ on tergite III to 200μ on tergite VIII. Marginal tubercles absent. Eighth tergite with 14 hairs. Subgenital plate with 29 hairs. Siphunculi pale, short, 0·22 mm long, about 1·3 times as long as the cauda,



Figs 46–50. *Pterocomma pilosum* (Buckton). Lectotype: Fig. 46. Head, upper (left) and lower surfaces. Figs 47, 48. Left antenna. Fig. 49. Apex of rostrum. Fig. 50. Siphunculus.

more or less cylindrical, with small flange. Cauda U-shaped, 0·17 mm long, four-fifths as long as its basal width, with about 20 long (150μ) hairs.

NOTES. Buckton describes the apterous and alate viviparous females and the nymph from specimens taken among colonies of *Pterocomma* (*Melanoxantherium*) *salicis* (L.) feeding on willow twigs. His manuscript notes are dated 28 September, but his published account gives the date as August. The plate contains figures of the three morphs described, but the 'aptera' (fig. 1) is drawn to a smaller scale than the other two morphs and gives the impression of being a young larva. Buckton's sketch for fig. 1 is an accurate drawing of the largest of the larvae on *343*, which is in fact larger than the nymph used as the model for fig. 2.

Siphonophora polygoni Buckton = ***Nasonovia ribisnigri*** (Mosley)

Aphis lactucae Schrank, 1801 : 120, partim, non L.
Aphis ribisnigri Mosley, 1841 : 684.
Aphis ribicola Kaltenbach, 1843 : 33.
Aphis hieracii Kaltenbach, 1843 : 17, partim; Walker, 1849*a* : 47.
Siphonophora alliariae Koch, 1855 : 177; Buckton, 1876 : 123.
Siphonophora polygoni Buckton, 1876 : 123; pl. 10, figs 1–3.
[*Siphonophora lactucae* (L.); Buckton, 1876 : 139. Misidentification.]
[*Siphonophora cichorii* Koch; Buckton, 1876 : 163, partim. Misidentification.]
[? *Myzus ribis* (L.); Buckton, 1876 : 180, partim. Misidentification.]
Macrosiphum kaltenbachi Schouteden, 1906*a* : 237.
? *Macrosiphum agrostemnium* Theobald, 1913 : 146.
Nasonovia ribicola (Kaltenbach) Mordvilko, 1929 : 51, 81.
Submacrosiphum hieracii ssp. *teriolanum* Hille Ris Lambers, 1931*b* : 10.
Nasonovia ribisnigri (Mosley) Hille Ris Lambers, 1947 : 316, Börner, 1952 : 136.

LECTOTYPE here designated: alate viviparous female. Surrey, Haslemere, Weycombe. *Polygonum persicaria*. 27.vi.1872. (*Buckton*). (*359**).

Paralectotypes: 1 alate viviparous female, 3 nymphs. Data as lectotype. (*359**).

BIOMETRIC DATA. Lectotype, alata: body length 2·04 mm, antennal flagellum 2·56 mm, ratios of segments III–VI 33 : 21 : 18 : 6 + 52, secondary rhinaria on III 46, on IV 9, on V 0, siphunculus 0·44 mm, cauda 0·22 mm, caudal hairs 7, ultimate rostral segment 0·17 mm, second segment of hind tarsus 0·14 mm, eighth tergite with 4 hairs, articular diameter of ant. seg. III 30μ, longest hair on ant. seg. III 35μ, on hind femur 30μ, on hind tibia 45μ, on eighth tergite 50μ.

All the five specimens on Buckton's single slide of *polygoni* are *Nasonovia ribisnigri* (Mosley). His original sketches, as well as the published figures, are consistent with the appearance of this species in life and I regard these specimens as his types. Only the alate female and the nymph are described and figured.

Theobald (1926 : 329) places *polygoni* Buckton in *Myzus* and paraphrases Buckton's description. He includes also a brief description of the aptera, which Buckton omits. The specimens which Theobald believed to be *polygoni* Buckton have been lost. Hille Ris Lambers, who examined Buckton's slide, was the first to identify *polygoni* correctly (H.R.L., 1933 : 174.)

Lachnus pyri Buckton = ***Pyrolachnus pyri*** (Buckton)

Lachnus pyri Buckton, 1899*a* : 274.
?*Dilachnus krishni* George, 1928 : 7.
Pyrolachnus pyri (Buckton) Basu & Hille Ris Lambers, 1968 : 13.

Buckton describes this species from specimens in alcohol sent to him by E. E. Green, who collected them in March, 1898, from pear trees in Ceylon. He gives brief accounts of the 'apterous larva' and the winged female, both of which he figures. Green adds a note that Buckton's descriptions and measurements were made from specimens shrivelled in alcohol, and gives some additional data based on living specimens, including a description of the adult aptera, which Buckton omitted. Green also adds figures of aptera and alata drawn from life.

There are no specimens of *pyri* in Buckton's collection. If types exist they are probably in Calcutta, but I have failed to trace them.

Basu & Hille Ris Lambers (1968 : 13) erect the genus *Pyrolachnus* with *pyri* Buckton as type.

Siphonophora rubi var. *rufa* = ***Macrosiphum funestum*** (Macchiati)

[*Siphonophora cyparissiae* Koch; Buckton, 1876 : 113, partim. Misidentification.]
Siphonophora rubi (Kaltenbach) var. *rufa* Buckton, 1883 : 105, pl. 130, fig. 1.
Siphonophora funesta Macchiati, 1885 : 67.
Macrosiphum rubifolium Theobald, 1917 : 78.
Macrosiphum shelkovnikovi Mordvilko, 1919 : 361.
Macrosiphum funestum (Macchiati); Hille Ris Lambers, 1939 : 90.

LECTOTYPE here designated: apterous viviparous female. SCOTLAND, Aberdeen. *Rubus fruticosus*. 20.viii.1878. (*Trail*). (*419*).

Paralectotypes: 6 apterous viviparous females, 4 larvae. Data as lectotype. (*400, 419*).

BIOMETRIC DATA. Lectotype, aptera: body length 3·12 mm, antennal flagellum 4·02 mm, ratios of segments III–VI 51 : 39 : 37 : 11 + 63, secondary rhinaria on III 6 and 7, siphunculus 1·24 mm, cauda 0·46 mm, caudal hairs 12, ultimate rostral segment 0·19 mm, second segment of hind tarsus 0·15 mm, eighth tergite with 7 hairs, articular diameter of ant. seg. III 44μ, longest hair on ant. seg. III 46μ, on hind femur 50μ, on hind tibia 55μ, on eighth tergite ±60μ.

Siphonophora scrophulariae Buckton = ***Cryptomyzus galeopsidis*** (Kaltenbach)

Aphis galeopsidis Kaltenbach, 1843 : 35. [No type exists.]
Aphis quaerens Walker, 1849*b* : xlviii.
Siphonophora scrophulariae Buckton, 1876 : 137; pl. 16, figs 1, 2. **Syn. n.**
Myzus lamii van der Goot, 1912 : 69.
Myzus whitei Theobald, 1912 : 110.
Myzus dispar Patch, 1914 : 56.
Myzus galeopsidis (Kaltenbach) van der Goot, 1915 : 107, Börner, 1920 : 119.
Capitophorus quaerens (Walker) Theobald, 1926 : 234.
Capitophorus whitei (Theobald) Theobald, 1926 : 234, partim.
Capitophorus lamii (van der Goot) Theobald, 1926 : 253, partim.

Cryptomyzus (*Myzella*) *galeopsidis* (Kaltenbach) Börner, 1930 : 139.
Myzella galeopsidis (Kaltenbach) Börner, 1938 : 472, 1952 : 134.
Cryptomyzus galeopsidis (Kaltenbach) Hille Ris Lambers, 1953 : 96.

LECTOTYPE here designated: alate viviparous female. Surrey, Haslemere. *Scrophularia nodosa* or *S. scorodonia*. 16.vii.(year ?). (*Buckton*). (*209*).

Paralectotypes: 1 alate, 1 apterous viviparous females, 1 nymph. Data as lectotype. (*209*).

Biometric data. Lectotype, alata: body length 2·48 mm, antennal flagellum 3·42 mm, ratios of segments III–VI 33 : 27 : 25 : 7 + 79, secondary rhinaria on III 54, on IV 28, on V 6, siphunculus 0·34 mm, cauda 0·16 mm, caudal hairs 5, ultimate rostral segment 0·13 mm, second segment of hind tarsus 0·13 mm, eighth tergite with 6 hairs, articular diameter of ant. seg. III 36μ, longest hair on ant. seg. III 26μ, on hind femur 40μ, on hind tibia 50μ, on eighth tergite 40μ (?).

Paralectotype, aptera: body length 1·64 mm, ant. flag. 3·14 mm, ratios of segs III–VI 35 : 26 : 25 : 8 + 63, sec. rhin. on III 5, 7, siphunculus 0·30 mm, cauda 0·17 mm, caudal hairs 5, ult. rost. seg. 0·11 mm, second seg. hind tarsus 0·12 mm, eighth tergite with 4 (?) hairs, artic. diam. ant. seg. III 42μ, longest hair on ant. seg. III 55μ, on hind femur 44μ, on hind tibia 60μ, on eighth tergite 70μ, on vertex 60μ.

Buckton describes the apterous and alate viviparous females and nymph, but figures only the alata and nymph. He gives the host-plant as *Scrophularia scorodonia*, which he calls 'common figroot' in the text and 'figwort' in his notes. The Common Figwort is *Scrophularia nodosa*, not *scorodonia* which is the Balm-leaved Figwort and only locally common.

There are no specimens named *scrophulariae* by Buckton, or bearing other data corresponding either with his published account or scanty notes. His original sketches give a distinct impression of a *Cryptomyzus* species, an impression supported by mention of gibbous first antennal segments, antennae 'long and hairy', and pale cornicles. The last, however, are given in the text as 'cylindrical and straight' in the aptera, 'thin, yellow, straight' in the alata, but 'like *Rhopalosiphum*' in his notes on the alata. The sketch shows thin, cylindrical cornicles in the alata, while the nymph has one cylindrical and one swollen. The only specimens of a *Cryptomyzus* species in Buckton's collection are two alatae, a nymph and an aptera of *C. galeopsidis* (Kaltenbach) on *209*, labelled originally '*Ch. aceris*. Sycamore.' and altered to '*Siphonophora*. Sycamore.' (cf. *gracilis*, p. 58.). Not without some hesitation, I accept these specimens as the types of *scrophulariae*, because the morphs described and figured are present on the slide, and the published measurements of the alata correspond fairly closely with one of the two mounted alatae, the attitude of which, moreover—slightly rolled to one side—is very similar to that in Buckton's sketch, as are the dark abdominal markings which become visible if a strong light is directed on to the top of the rather opaque specimen. The siphunculi of this alata are slightly swollen, those of the nymph distinctly so.

Theobald (1926 : 143) quotes Buckton's description verbatim and adds that Laing had found no slides of this species in Buckton's collection. Börner (1952 : 165) puts *scrophulariae* as a doubtful synonym of *Pleotrichophorus glandulosus* (Kaltenbach).

Siphonophora sisymbrii Buckton = ***Dactynotus cichorii*** (Koch)

[*Aphis picridis* sensu auctt. non Fabricius, 1775 : 737. Misidentifications.]
Siphonophora cichorii Koch, 1855 : 184.
Siphonophora sisymbrii Buckton, 1876 : 160; pl. 27, figs 4, 5.
Macrosiphum phillipsii Theobald, 1925 : 79, 1926 : 106.
[*Dactynotus cirsii* (L.); Hille Ris Lambers, 1931*a* : 170. Misidentification.]
Dactynotus cichorii (Koch) Hille Ris Lambers, 1939 : 13, Börner, 1952 : 171.

LECTOTYPE here designated: apterous viviparous female. Pembroke. *Sisymbrium officinale* (?) viii.(year ?). (*Barrett*). (*460**).

Paralectotypes: 1 alate, 4 apterous viviparous females, 1 larva. Data as lectotype. (*459**, *460**).

BIOMETRIC DATA. Lectotype, aptera: body length 3·38 mm, antennal flagellum not measurable (processi incomplete), ratios of segments III–base VI 50 : 33 : 28 : 9 + ?, secondary rhinaria on III 35, siphunculus 0·90 mm, cauda 0·58 mm, caudal hairs 21, ultimate rostral segment 0·24 mm, second segment of hind tarsus 0·18 mm, eighth tergite with 4 hairs, articular diameter of ant. seg. III 44μ, longest hair on ant. seg. III 48μ, on hind femur 50μ, on hind tibia 70μ, on eighth tergite 80μ, on vertex 70μ.

The apterous and alate viviparous females are described and figured from specimens said to have been taken on *Sisymbrium officinale*. The original slide named *sisymbrii* by Buckton contained five apterae, one alata and a larva, remounted by Laing in 1925. Except for the alata, the specimens are in good condition, and all are *Dactynotus cichorii* (Koch).

Theobald (1926 : 88) quotes Buckton's description in full and adds some further data from an examination of his slide, but retains the name *sisymbrii*. Laing had labelled the remounted specimens *picridis* (F.) and Theobald, in his key to *Macrosiphum* (1926 : 63), adds a footnote accepting this diagnosis. Börner (1952 : 170) puts *sisymbrii* as a synonym of *Dactynotus obscurus* (Koch) apparently on the authority of Hille Ris Lambers (1939), but I can find no mention of *sisymbrii* Buckton in the work referred to.

Buckton's host-plant ascription is certainly mistaken; *cichorii* is a species normally confined to a restricted range of Compositae.

Chermes taxi Buckton : nomen dubium

Buckton, 1886 : 327; pl. 7, figs 1–3.

Buckton describes and figures the gall and what he calls the apterous viviparous female, taken on the Irish yew, *Taxus baccata* var. *fastigiata*, at Ealing, Middlesex, in March. I have failed to find either specimens or original drawings which might relate to this species.

Cholodkovsky (1896 : 27), on the evidence of Buckton's coloured plate and very short description of *taxi*, concludes that Buckton had described a species of *Lecanium* (Coccoidea). Schouteden (1906*b* : 35) quotes Cholodkovsky's opinion. Lindinger (1912 : 320, No. 1108) quotes Buckton's description and places *taxi* doubtfully in *Pseudococcus*.

Dr D. J. Williams, coccidologist on the staff of the Commonwealth Institute of

Entomology, whom I consulted, knows of no coccid associated with *Taxus* that would agree with the description and figures of *taxi*. He suggested, however, that if Buckton had mistaken *Picea* for *Taxus*, the gall might possibly have been the work of *Physokermes abietis* (Geoffroy). But unless further evidence comes to light, *Chermes taxi* must be regarded as a *nomen dubium*.

Ceylonia theaecola = ***Toxoptera aurantii*** (Boyer de Fonscolombe)

Aphis aurantii Boyer de Fonscolombe, 1841 : 178.
Aphis camelliae Kaltenbach, 1843 : 122.
Toxoptera aurantiae Koch, 1856 : 330.
Aphis coffeae Nietner, 1861 : 3.
Ceylonia theaecola Buckton, 1891*a* : 34.
Toxoptera theobromae Schouteden, 1906*c* : 38.
Toxoptera citrifoliae Shiraki, 1913 : 123.

LECTOTYPE here designated: apterous viviparous female. CEYLON. *Thea* sp. ii.1890. (*Green*). (*484*).

Paralectotypes: 4 alatae, 52 apterae, nymphs, larvae. Data as lectotype. (*480–485*).

BIOMETRIC DATA. Lectotype, aptera: body length 1·76 mm, antennal flagellum 1·22 mm, ratios of segments III–VI 38 : 30 : 28 : 11 + 45, siphunculus 0·24 mm, cauda 0·19 mm, caudal hairs 20, ultimate rostral segment 0·12 mm, second segment of hind tarsus 0·09 mm, eighth tergite with 2 hairs, articular diameter of ant. seg. III 28μ, longest hair on ant. seg. III 20μ, on hind femur 60μ, on hind tibia 50μ, on eighth tergite 60μ.

Paralectotype alata: body length 1·32 mm, ant. flag. 1·36 mm, ratios segs III–VI 43 : 33 : 33 : 11 + 51, secondary rhinaria on III 4, siph. 0·27 mm, cauda 0·18 mm, caudal hairs 11, ult. rost. seg. ?, second seg. hind tarsus 0·09 mm, eighth tergite with 2 hairs, artic. diam. ant. seg. III 22μ, longest hair on ant. seg. III 24μ, on hind femur 60μ, on hind tibia 60μ, on eighth tergite 55μ.

Apterous and alate forms are briefly described and very poorly figured, from specimens taken from tea plants in Ceylon in February, 1890, and sent to Buckton for identification. There are six slides in the Buckton Collection, labelled but not signed by Laing, which have the appearance of his remounts. None bears data in Buckton's hand. Most of the specimens are in poor condition suggesting preservation in alcohol, but two apterae and two alatae are well enough preserved to make identification certain. All are *aurantii* Boyer de Fonscolombe.

Megoura viciae Buckton

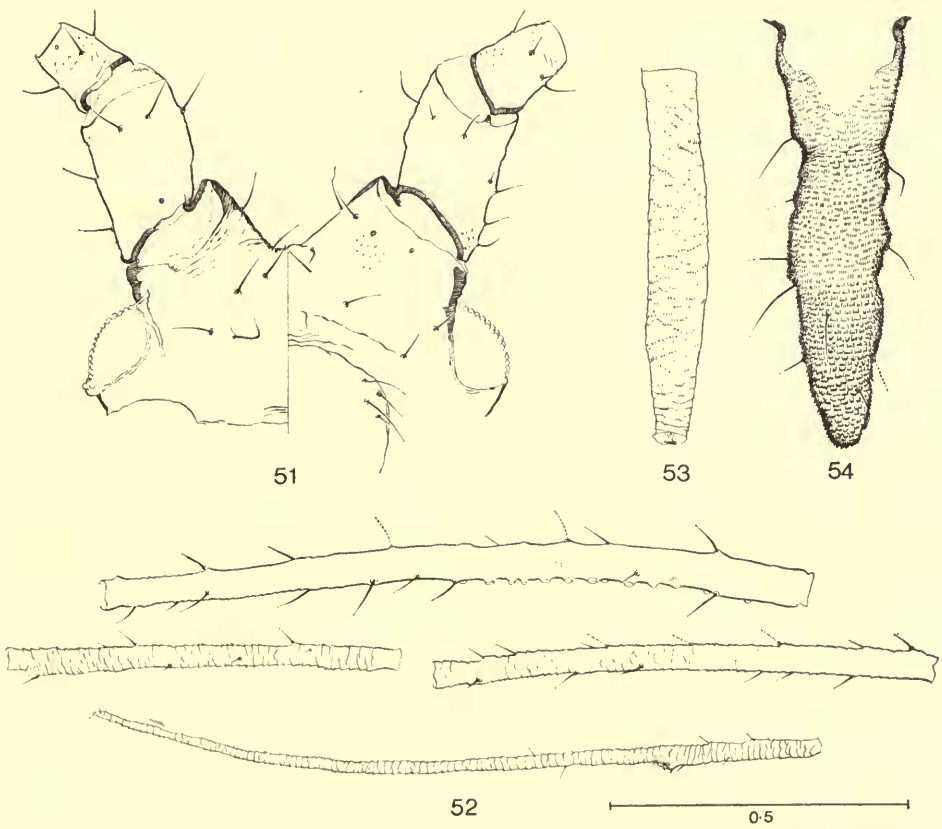
(Pl. 6, fig. 66; Text-figs 51–54)

Aphis viciae Kaltenbach, 1843 : 20, nec Fabricius, 1781 : 390.
Siphonophora viciae (Kaltenbach) Koch, 1855 : 188.
Megoura viciae Buckton, 1876 : 188; pl. 38, figs 1, 2.
Megoura viciae Buckton; Theobald, 1926 : 173, Hille Ris Lambers, 1947 : 264, Börner, 1952 : 177.
Megoura bibula Hottes, 1930 : 184.
Rhopalosiphum papilionacearum Lindinger, 1932 : 278.
Megoura kaltenbachi Hille Ris Lambers, 1938 : 1.

LECTOTYPE here designated: apterous viviparous female. Norfolk, Norwich, Ketteringham. *Vicia sepium.* ix.(year ?). (*Barrett*). (*518**).

Paralectotypes: 4 apterous, 1 alate viviparous females, 3 larvae. Data as lectotype. (*518a**, *519**, *520a**, *520b**, *522*).

Apterous viviparous female. (Plate 6, fig. 66; Text-figs 51–54.) *Colour* of macerated specimen: body pale yellowish brown; head, siphuncular sclerites, eighth tergite, anal and subgenital plates darker to blackish brown. Antennae, rostrum, siphunculi, cauda very dark brown to black, except base of antennal segment III and whole of VI which are paler brown. Femora blackish brown on distal half, remainder pale yellowish, tibiae mid-brown with black apices, tarsi dark. *Morphology:* body large, broadly spindle-shaped, 4–4·3 mm long, rather more than twice as long as broad. Head smooth, antennal tubercles large, diverging, cephalic hairs fine, acute, long, the longest reaching about 90μ. Antennal flagellum 3·9 mm long, ratios of segments III–VI 116 : 84 : 66 : 26 + 94; antennal hairs rather stout, spiny, blunt or acute, up to 60μ long or about equal to articular diameter of III. The third segment bears 16 and 14 small, tuberculate, secondary rhinaria irregularly distributed on the postero-ventral surface of the



FIGS 51–54. *Megoura viciae* (Buckton). Lectotype: Fig. 51. Head, upper (left) and lower surfaces. Fig. 52. Left antennal segments III–VI. Fig. 53. Siphunculus. Fig. 54. Cauda.

basal half of the segment. Rostrum small, reaching middle coxae, apical segment 0·13–0·14 mm long, less than twice as long as its basal width and about two-thirds as long as second segment of hind tarsus (0·19 mm), with 4 non-apical hairs. Legs with stout, spiny hairs up to 60μ long on hind femora and, rarely, up to 100μ long on hind tibiae, on which hairs become shorter, thicker and more numerous towards apices. First tarsal segments all with 3 hairs. Abdomen with dorsal hairs rather sparse, acute, blunt or with very slightly swollen apices, reaching about 70μ on the third tergite and 90μ on the eighth. Ante- and postsiphuncular sclerites present, and a faintly darkened transverse sclerotic area on the eighth tergite, which bears 7 hairs. Subgenital plate with 2–3 anterior and 11–14 posterior hairs. Siphunculi fusiform, widest about the middle, tapering evenly to base and apex, the greatest diameter about twice the smallest, which is close to the small flange, imbricate over whole length with a few transverse apical striations, 0·56–0·64 mm long, about 0·14 as long as the body and not quite as long as the cauda. Cauda 0·57–0·72 mm long, elongate, tapering to a blunt apex, with a slight constriction at about one-third of its length from the base, with 12 hairs.

NOTES. The apterous and alate viviparous females are described and figured. Unfortunately, Buckton's original drawings and notes relating to *viciae* are missing. His specimens, originally mounted on five slides (*518–522*) consist of eight adult apterae, one alata and five larvae, all of *Megoura viciae* Buckton. All the slides bear Buckton's labels except *521*, the specimens on which (three apterae and two larvae) were remounted by Laing in 1920. Since this slide is marked 'Aberdeen. August.', I exclude these specimens from the type-series. Buckton's published account makes no mention of material from Aberdeen.

A full synonymy (up to 1948) and a discussion on the nomenclature of *viciae* is given by Hille Ris Lambers (1949 : 263–268).

Forda viridana Buckton = ***Forda formicaria*** von Heyden

Forda formicaria von Heyden, 1837 : 292.
Rhizoterus vacca Hartig, 1841 : 363.
Pemphigus semilunarius Passerini, 1856 : 261.
Forda viridana Buckton, 1883 : 85; pl. 127, figs 1, 2.
Geoica cyperi Schouteden, 1902 : 656.

LECTOTYPE here designated: apterous viviparous female. Northumberland, Alnwick. *Carex* sp. roots, in ants' nest. (Undated). (*Hardy*). (*523**).

Paralectotypes: 2 larvae. Data as lectotype. (*523a**, *523b**).

BIOMETRIC DATA. Lectotype, aptera: body length 2·54 mm, whole antenna 0·84 mm, ratios of segments I–V 13 : 12 : 44 : 19 : 20, ultimate rostral segment 0·27 mm, second segment of hind tarsus 0·16 mm, articular diameter of ant. seg. III 40μ, longest hair on ant. seg. III 85μ, on vertex 100μ, on hind femur 75μ, on hind tibia 80μ.

Buckton describes the viviparous female and figures a brown and a green form. The green form, according to the text and the figure legend, occurred in nests of *Formica fuliginosa* under tufts of *Aira flexuosa* near Wooler, Northumberland. The brown form is recorded from nests under tufts of *Carex* near Alnwick. It seems that both forms were sent to Buckton by Hardy. The two figures of *viridana* are the only ones on plate 127 for which original sketches and notes have not been found.

There is no slide named *viridana*, but there is one (*523*) which carries the data '*Carex* roots. Ants' nests. Alnwick.', together with two MS names, *Forda hirsuta* replaced by *Forda pilosa*. The slide originally contained an adult aptera and two larvae (now remounted) of *Forda formicaria* von Heyden which Laing (as quoted by Theobald, 1929 : 176) believed to be the types of *viridana*. The host and locality data on the slide correspond so closely with those published that I accept Laing's conclusion.

LIST OF NON-BUCKTONIAN SPECIES

Listed here are the aphid species (excluding Phylloxeridae) of authors other than himself which Buckton published in his monograph, or of which material is present in his collection. In each case the name and author as used by Buckton are followed by the current identification and the numbers of the slides containing specimens on which Buckton's descriptions and figures are known or believed to be based. References are to Buckton's works, unless otherwise stated.

abietina Walker, *Aphis* (1879 : 43, pl. 49) = *Elatobium abietinum* (Walker) (*2*).

abietis L., *Chermes* (1883 : 24, pls 116, 118, 119) = *Adelges viridis* (Ratzeburg) (*7*, *9a*).

absinthii L., *Siphonophora* (1876 : 154, pl. 24) = *Macrosiphoniella absinthii* (L.). The description and figures are drawn from a larva (cf. *11*, *14*). A Walker slide (*W.22*), labelled *absinthii*, contains *Macrosiphoniella artemisiae* (Boyer de Fonscolombe).

acerina (Walker), *Drepanosiphum* (1876 : 185, pl. 37) = *Drepanosiphum acerinum* (Walker) (*19*).

aceris (L.), *Chaitophorus* (1879 : 121, pls 78, 79): apterous viviparous female (pl. 78, fig. 1) = *Periphyllus hirticornis* (Walker) (*23*), alate viviparous female (variety α, pl. 78, fig. 2) probably = *P. acericola* (Walker) (not identifiable with a specimen; original sketch missing), alate viviparous female (variety β, pl. 78, fig. 3) = *P. testudinaceus* (Fernie) (cf. *21*; original sketch missing), apterous male (pl. 78, fig. 4) = *P. rhenanus* (Börner) (*24*; specimen from Lichtenstein), dimorph (pl. 78, fig. 5) probably = *P. testudinaceus* (not identifiable with a specimen), ovipara (pl. 78, fig. 6) = *P. rhenanus* (*24*; also from Lichtenstein), dimorph (pl. 79, fig. 6) = *P. testudinaceus* (cf. *27*), exuvia (pl. 79, fig. 7) = *P. testudinaceus* (*27*), dimorph (pl. 79, fig. 8) = *P. acericola* (*27*). The alate male described (p. 124) but not figured is also likely to be *P. rhenanus* (*25*), all the material of which is from *Acer monspessulanus* at Montpellier.

affinis (Kaltenbach), *Thecabius*: there are unpublished sketches of a leaf-gall, fundatrix and alate antenna, drawn from specimens sent by Lichtenstein. Buckton excluded *affinis* Kaltenbach from his monograph in the belief that it was not a British species. Three alate *affinis* occur among his material named *Pemphigus bursarius* (L.) (*80*, *81*).

agilis Kaltenbach, *Lachnus* (1881 : 47, pl. 96). Material so named in the Buckton Collection is a mixture of *Eulachnus agilis* (Kaltenbach) and *E. brevipilosus* Börner, but the specimens described and figured are *brevipilosus* only.

alliariae (Koch), *Siphonophora* (1876 : 123, pl. 10) = *Nasonovia ribisnigri* (Mosley) (*34*).

alni (F.), *Pterocallis* (1881 : 31, pl. 92) = *Pterocallis alni* (DeGeer) (*35, 36*).

amygdali Boyer de Fonscolombe, *Aphis* (1879 : 104, pl. 73): aptera (figs 1, 2) = *Appelia schwartzi* (Börner) (*39*), alata (fig. 3) ? = *Dysaphis* (*Pomaphis*) *plantaginea* (Passerini).

artemisiae Koch, *Siphonophora* (1876 : 155, pl. 24) = *Macrosiphoniella absinthii* (L.) (*17*).

arundinis (F.), *Hyalopterus* (1879 : 111, pl. 75) = *Hyalopterus pruni* (Geoffroy) (*45*).

atriplicis L., *Aphis* (1879 : 87, pl. 65): apterous and alate viviparous females, nymph (figs 4–7) = *Aphis fabae* Scopoli (*46, 47*), apterous male, ovipara (not figured) = *Hayhurstia atriplicis* (L.) (*48*; specimens from Lichtenstein).

avellanae (Schrank), *Siphonophora* (1876 : 149, pl. 22) = *Corylobium avellanae* (Schrank) (*50, 51*).

berberidis (Kaltenbach), *Rhopalosiphum* (1879 : 14, pl. 42) = *Liosomaphis berberidis* (Kaltenbach) (*59, 60*).

betulae Heyden, *Glyphina* (1883 : 17, pl. 117) = *Pemphigus bursarius* (L.) (*71*). Buckton's slide contains a fundatrix, nymphs, larvae and an alate migrant on which his description and figures are based. His original sketches are rough and uncoloured. There is no clue to the origin of these specimens.

betularius (Kaltenbach), *Callipterus* (1881 : 14, pl. 87): apterous and alate viviparous females (figs 1, 3) = *Kallistaphis basalis* Stroyan (*68*), ovipara (fig. 2) = *Euceraphis punctipennis* (Zetterstedt) (*66*).

betulicola (Kaltenbach ?), *Callipterus* (1881 : 15, pl. 88): apterous viviparous female (fig. 2) = *Kallistaphis basalis* Stroyan (*69*; specimen mounted on its side as figured), alata (fig. 1) = *Euceraphis punctipennis* (Zetterstedt) (*69*). This specimen contains spores of a fungus, the presence of which could explain Buckton's reference to 'cottony tufts' on antennae and legs.

brassicae L., *Aphis* (1879 : 33, pl. 46) = *Brevicoryne brassicae* (L.) (*76*).

bursarius Hartig, *Pemphigus* (1881 : 117, pls 111, 113): fundatrix (pl. 111, fig. 1) probably = *Pemphigus bursarius* (L.) (Buckton's sketch is labelled Walthamstow, which suggests a Walker specimen, but none has come to light), nymph and alata (pl. 111, figs 2, 3) = *P. bursarius* (*80*), galls (pl. 111, figs 4, 5) = *P. bursarius*. The fundatrix, alate antenna and gall, named *bursarius* and figured on plate 113 (figs 6-8), are drawn from material received from Lichtenstein and are *P. immunis* Buckton (*78, 79*). Another slide (*84*) also named *bursarius*, with host given as spruce, contains an alate *Mimeuria ulmiphila* (del Guercio).

capreae (F.), *Siphocoryne* (1879 : 27, pl. 45) = *Cavariella aegopodii* (Scopoli) (*85*).

capreae Koch, *Chaitophorus* (1879 : 136, pl. 81) = *Chaitophorus truncatus* (Hausmann) (*86*).

cardui L., *Aphis* (1879 : 92, pl. 67) = *Brachycaudus cardui* (L.) (*87, 228*).

carpini Koch, *Callipterus* (1881 : 19, pl. 89): nymph (fig. 1) = *Myzocallis carpini* (Koch) (*92*), alate viviparous female (fig. 2) = *Euceraphis punctipennis* (Zetterstedt) (*92*), ovipara (fig. 3) = *Betulaphis quadrituberculata* (Kaltenbach) (*94*), apterous male (fig. 4) = *B. quadrituberculata* (*94*), alate male (fig. 5) = *E.*

punctipennis (alate female, *93*), apterous viviparous female (not figured) perhaps = *quadrituberculata* (immature, *91* or *94*).

cerasi (F.), *Myzus* (1876 : 174, pl. 33) = *Myzus cerasi* (F.) (*100*, *W.212*), except the alate male (fig. 4) which = *Myzus persicae* (Sulzer) (*99*).

chelidonii (Kaltenbach), *Siphonophora* (1876 : 121, pl. 9) = *Macrosiphum* (*Sitobion*) *fragariae* (Walker) (*102*).

cichorii Koch, *Siphonophora* (1876 : 163, pl. 29). No specimens have been found which relate to this species. Buckton's sketch of the aptera suggests *Nasonovia ribisnigri* (Mosley) (cf. Börner, 1952 : 136). The alata, probably a vagrant, is a *Dactynotus*, perhaps *cirsii* (L.).

cimiciformis von Heyden, *Paracletus* (1881 : 67, pl. 102) = *Anoecia* ? *corni* (F.) (*126*); described from material sent by Hardy from Berwick, Northumberland.

cistatus Walker, *Dryobius* (1881 : 78, not figured) = *Lachniella costata* (Zetterstedt). As Laing pointed out (Laing, 1923 : 245), this description relates to an alate *costata* on a Walker slide in Buckton's collection (*W.269*), the name on which is indistinctly written. The name *cistata* (Buckton) therefore falls as a synonym of *costata* (Zetterstedt).

compressa (Koch), *Colopha*. Two slides (*107*, *108*) contain fundatrices, nymphs and alatae obtained from Montpellier. A sheet with notes and coloured sketches of fundatrix, alate migrant and gall is among Buckton's unpublished originals.

convolvuli (Kaltenbach), *Siphonophora* (1876 : 148, pl. 21): apterous viviparous female, nymph (figs 1, 2) = *Aulacorthum solani* (Kaltenbach) (*109*), alate viviparous female (fig. 3) = *Myzus persicae* (Sulzer) (*110*).

corni (F.), *Schizoneura* (1881 : 107, pl. 110) = *Anoecia corni* (F.) group (*119*, *125*). The specimens received from Lichtenstein to which Buckton refers on p. 109 are on *118* and *119*.

corticalis Kaltenbach, *Chermes* (1883 : 23, pls 117, 117 bis) = *Pineus pini* (Gmelin *in* Linnaeus) (*112*). Slide *113*, also named *corticalis*, contains *Adelges* (*Dreyfusia*) *nordmannianae* (Eckstein) collected by McLachlan from *Pinus nordmanniana*.

coryli Goeze, *Callipterus* (1881 : 17, pl. 88) = *Myzocallis coryli* (Goeze) (*127*).

crataegaria Walker, *Aphis* (1879 : 37, pl. 47) = *Aphis pomi* DeGeer (*128*).

crataegi Kaltenbach, *Aphis* (1879 : 35, pl. 47) = *Aphis pomi* DeGeer (*129*).

croaticus Koch, *Dryobius* (1881 : 74, pl. 104) = *Lachnus roboris* (L.). The specimens collected by Andrews at Southwater, Sussex, are those on *133*, *134* and *135*; those from Lichtenstein are on *137*. Another slide (*136*), labelled '*croaticus* = *roboris* Walker', contains an alate *longirostris* Börner and may be one of the Walker specimens to which Buckton refers (pp. 76, 77).

cyparissiae Koch, *Siphonophora* (1876 : 113, pl. 5): alata = *Macrosiphum funestum* (Macchiati) (*141*), aptera probably = *M. rosae* (L.) from *Scabiosa* (cf. *448*, *450*).

dianthi Schrank, *Rhopalosiphum* (1879 : 15, pl. 43) = *Myzus persicae* (Sulzer) (*321*, *322*, *325*).

dirhoda (Walker), *Siphonophora* (1876 : 132, pl. 13 bis) = *Metopolophium dirhodum* (Walker) (*148–150*).

dryophila Westwood, *Thelaxes* (1883 : 8, pl. 115) = *Thelaxes dryophila* (Schrank) (*155*, *156*, *158*, *159*). The specimens sent by Foran from Eastbourne, Sussex, are

on *157*; a male, ovipara and eggs from Montpellier on *156* are likely to be the models for figs 6 and 7.

epilobii Kaltenbach, *Aphis* (1879 : 71, pl. 58) = *Aphis epilobiaria* Theobald (*164, 165*).

eragrostidis, Tychea (1883 : 89, pl. 128): fundatrix (fig. 5) = *Aploneura lentisci* (Passerini) (*166*), fundatrigenia (fig. 6) ? = *Pemphigus* sp. (*166*).

eriophori (Haliday), *Hyalopterus* (1879 : 117, not figured) = *Ceruraphis eriophori* (Walker) (*W.337*).

euonymi F., *Aphis* (1879 : 72, pl. 59): apterous viviparous female (fig. 1) = *Aphis evonymi* F. (*170*), alata and nymph (not figured) = mixture of *evonymi* and *fabae* Scopoli (*167, 168, 169, 171*). The specimens sent by Trail from Aberdeen are *fabae* (*168, 169*).

fagi (L.), *Phyllaphis* (1881 : 37, pl. 94) = *Phyllaphis fagi* (L.) (*172–174*). Buckton's drawing of an 'apterous male' is taken from a larval ovipara on *173*.

farfarae Koch, *Aphis* (1879 : 68, pl. 57) = *Anuraphis farfarae* (Koch) (*176*).

filaginis (Boyer de Fonscolombe), *Pemphigus* (1881 : 128, pl. 114) ? = *Pemphigus filaginis* (Boyer de Fonscolombe). Buckton's only slide named *filaginis* (*177*) contains some poorly preserved alatae of a *Pemphigus* sp. indet. received from Lichtenstein. His figures of *filaginis* are based on some uncoloured sketches of specimens which, according to his notes, are probably those sent by Hardy from *Gnaphalium* in Scotland. If so his diagnosis is probably correct. The Scottish material is no longer extant.

flava (Forbes), *Sipha: 178–180* contain specimens from *Sorghum*, Illinois, U.S.A.

foeniculi Passerini, *Siphocoryne* (1879 : 26, pl. 45) ? = *Cavariella* sp. There are no specimens named *foeniculi* by Buckton. His description and figures, especially his sketches, suggest *Cavariella* rather than *Hyadaphis*, despite his statement (p. 27) that there is no supracaudal process.

formicaria von Heyden, *Forda* (1883 : 83, pl. 126) = *Forda formicaria* von Heyden (*186, 188*). Fig. 2 may be drawn from a larval *Anoecia* sp. (cf. *116, 117*).

fragariae Koch, *Siphonophora* (1876 : 125, not figured) = mixture of *Macrosiphum* (*Sitobion*) *fragariae* (Walker), *Aulacorthum solani* (Kaltenbach) and *Myzus persicae* (Sulzer) (*191, 192*).

fuscifrons Koch, *Pemphigus* (1881 : 113, pl. 110) = *Pemphigus bursarius* (L.) (*75, 201, 202*), except ovipara (fig. 8) which probably = *Aploneura lentisci* (Passerini) (*200*; specimen from Lichtenstein, named *fuscicornis*).

galeopsidis (Kaltenbach), *Phorodon* (1876 : 171, pl. 32) = *Capitophorus hippophaes* (Walker) (*207*).

granaria (Kirby), *Siphonophora* (1876 : 114, pl. 6) = *Macrosiphum* (*Sitobion*) *fragariae* (Walker) (*190, 211*).

hederae Kaltenbach, *Aphis* (1879 : 75, pl. 60) = *Aphis hederae* Kaltenbach (*212*).

hieracii Kaltenbach, *Aphis* (1879 : 67, pl. 57) = *Aphis hieracii* Buckton non Kaltenbach, *nomen dubium*. There are no specimens which I can identify with Buckton's description and figures. His original sketches of *hieracii* are missing. This cannot be *hieracii* of Kaltenbach or of Schrank, and without further evidence must remain undetermined.

hieracii Kaltenbach, *Siphonophora* (1876 : 126, pl. 11) ? = *Nasonovia compositellae* ssp. *nigra* Hille Ris Lambers. Buckton's specimens, which he collected himself on *Hieracium sylvestre* and *H. murorum* at Weycombe on 3 July, are missing from his collection. His original sketches and his host-record point to *nigra* as a probability. The sketches do not relate to a Walker slide (*W.411*), labelled *Siphonophora hieracii* by Buckton, which contains *Nasonovia ribisnigri* (Mosley) from Burdock at Southgate, nor to *213*, unnamed, which contains *Nasonovia pilosellae* Börner from *Hieracium* at Berwick. Buckton records having received these from Hardy in August (year not given) in a manuscript note added to his own copy of his monograph (Vol. I, p. 146)[3].

humuli (Schrank), *Phorodon*, (1876 : 166, pl. 30) = *Phorodon humuli* (Schrank) (*214–216*).

humuli var. *mahaleb* (Boyer de Fonscolombe), *Phorodon* (1876 : 168, pl. 31) = *Phorodon humuli* (Schrank) (*275, 276*).

jaceae (L.), *Siphonophora* (1876 : 153, pl. 23) = *Dactynotus* (*Uromelan*) *jaceae* (L.) (*221, 222*).

jacobaeae Schrank, *Aphis* (1879 : 79, pl. 62) = *Aphis jacobaeae* Schrank (*223, 227*).

juglandicola (Kaltenbach), *Pterocallis* (1881 : 32, pl. 92) = *Chromaphis juglandicola* (Kaltenbach) (*231*).

juglandis (Frisch), *Ptychodes* (1881 : 40, pl. 95) = *Callaphis juglandis* (Goeze) (*229, 230*).

juniperi (F.), *Lachnus* (1881 : 44, pl. 96) = *Cinara juniperi* (DeGeer) (*232–234*).

laburni Kaltenbach, *Aphis* (1879 : 86, pl. 65) = *Aphis cytisorum* Hartig (*235*).

lactucae (Kaltenbach), *Rhopalosiphum* (1879 : 10, pl. 40): alata (fig. 4) (? also larva, fig. 2, and nymph, fig. 3) = *Hyperomyzus lactucae* (L.) (cf. *237*), aptera (fig. 1) = *H. lampsanae* (Börner) (*236*).

lactucae (Kaltenbach), *Siphonophora* (1876 : 139, pl. 16) probably = *Nasonovia ribisnigri* (Mosley), to judge from Buckton's sketches. No extant specimens relate to this species.

lactucarius Passerini, *Pemphigus* (1881 : 124, pl. 112) = *Pemphigus bursarius* (L.) (*77, 82*).

lanigera (Hausmann), *Schizoneura* (1881 : 89, pls 105, 106) = *Eriosoma lanigerum* (Hausmann) (*241–245*). Most of Buckton's figures can be matched with specimens. Those from Lichtenstein, mentioned on p. 93, are on *243* and *245*.

lanuginosa Hartig, *Schizoneura* (1881 : 104, pl. 109) = *Schizoneura lanuginosa* Hartig (*246–249*).

laricis Hartig, *Chermes* (1883 : 33, pls 119, 120) = *Adelges laricis* Vallot (*250, 255*) and *Adelges viridis* (Ratzeburg) (*251*).

lataniae Lichtenstein, *Cerataphis* (1883 : 198, pl. 134). Buckton's apterae, all from 'palms and orchids' under glass at Chichester, Sussex (*Anderson*), are *Cerataphis orchidearum* (Westwood) (*259, 261, 262*). His alata, described and figured from specimens sent by Lichtenstein from Montpellier, appears to be *C. lataniae* (Boisduval) (*258*).

[3]In the library of the Royal Entomological Society of London.

leucomelas Koch, *Chaitophorus* (1879 : 135, pl. 80) = *Chaitophorus versicolor* Koch (*263*).

ligustri (Kaltenbach), *Rhopalosiphum* (1879 : 13, pl. 41) = *Myzus ligustri* (Mosley) (*264*).

longipes Dufour, *Lachnus* (1881 : 59, pl. 101) = *Tuberolachnus salignus* (Gmelin) (*265*).

longistigma Monell, *Lachnus* (1881 : 61) = *Longistigma caryae* Harris (*267–269*). Buckton likens this American species to *longipes* Dufour.

lychnidis L., *Aphis* (1879 : 73, pl. 59): aptera (fig. 2) = *Brachycaudus klugkisti* (Börner) (*272*), alata (fig. 3) = *Aphis hederae* Kaltenbach (*273*).

mali F., *Aphis* (1879 : 44, pls. 50, 69 bis): fundatrix (pl. 50, fig. 1) = *Dysaphis* (*Pomaphis*) *plantaginea* (Passerini) (*277*), apterous and alate viviparous females, nymph (pl. 50, figs 2, 5, 6) ? = *Rhopalosiphum insertum* (Walker) (*277*), apterous male (not figured) and ovipara (pl. 69 bis, fig. 1) = *Aphis pomi* DeGeer (*278*). The sexuales on *278* are those sent by Lichtenstein to which Buckton refers on p. 48.

malvae Walker, *Aphis* (1879 : 42, pl. 49): aptera (fig. 1) = *Acyrthosiphon malvae* (Mosley) larva (*279*), ovipara (not figured) ? = *Myzus persicae* (Sulzer) apterous viviparous female (*280*), alate viviparous female (fig. 2) unidentifiable. Buckton's sketches include one of the 'ovipara' (not reproduced) which suggests a sclerotic winter aptera or larva of *persicae*, perhaps one of those on *280* from *Cineraria* in November.

millefolii (F.), *Siphonophora* (1876 : 127, pl. 12) = *Macrosiphoniella millefolii* (DeGeer) (*285–287*).

myosotidis Koch, *Aphis* (1879 : 102, pl. 72). There are no specimens so named by Buckton. His descriptions and sketches suggest that his aptera and larva (figs 1, 2) are probably *Brachycaudus helichrysi* (Kaltenbach) and his alata (fig. 3) *B. cardui* (L.). His notes imply that all three figures are drawn from specimens from *Senecio vulgaris*.

nephrelepidis Davis, *Idiopterus:* slide *295* (unnamed) contains apterae from ferns in a greenhouse at Eastbourne, Sussex, as noted by Laing (Laing, 1923 : 241).

nymphaeae (L.), *Rhopalosiphum* (1879 : 12, pl. 41) = *Rhopalosiphum nymphaeae* (L.) (*296*).

oxyacanthae Koch, *Aphis* (1879 : 37): not described or figured by Buckton, but mentioned in passing as a *Crataegus*-feeding aphid different from *crataegi* Kaltenbach. The only slides labelled *oxyacanthae* Koch (*304, 305*) contain apterae, nymphs and males of *Dysaphis devecta* (Walker) from *Malus sylvestris*, specimens which I believe to be those described and figured by Buckton as *pyri* Boyer de Fonscolombe (1879 : 97, pl. 69).

padi Réaumur, *Aphis* (1879 : 61, pl. 55) = *Rhopalosiphum padi* (L.) (*306*).

pallidus (Haliday), *Pemphigus* (1881 : 127, pl. 113): fundatrix (fig. 1) ? = *Thecabius affinis* (Kaltenbach) (*308c*), nymph, alata (figs 2, 3) = *Kaltenbachiella pallida* (Haliday) (*308a, 308b*). Buckton's material of *pallida* was sent by Lichtenstein; there is no British material in his collection.

papaveris F., *Aphis* (1879 : 91, pl. 66) = *Aphis fabae* Scopoli (*309, 310*).

pastinacae (L.), *Siphocoryne* (1879 : 24, pl. 43) = *Cavariella aegopodii* (Scopoli) (*311*).

pelargonii (Kaltenbach), *Siphonophora* (1876 : 136, pl. 15) = *Acyrthosiphon malvae* (Mosley) (*313*, *314*).

persicae (Sulzer), *Myzus* (1876 : 178, pl. 35) = *Myzus persicae* (Sulzer) (*324*, *327*, *328*, *330*).

phaseoli Passerini, *Tychea* (1883 : 90, pl. 128) = *Smynthurodes betae* Westwood (*334*).

piceae Walker, *Lachnus* (1881 : 58, pl. 100) = *Cinara piceae* (Panzer) (*338*).

pini Koch(?), *Chermes* (1883 : 40, pl. 117 bis) ? = *Pineus pini* (Gmelin *in* Linnaeus). There is no material so named.

pini (L.), *Lachnus* (1881 : 50, pl. 97; 1886 : 324, pl. 5): aptera (pl. 97, fig. 3; pl. 5, fig. 1) = *Cinara pinicola* (Kalt.), ovipara (*274*) (see above, p. 66), aptera, 'dark variety' (pl. 97, fig. 4) = *Cinara pinea* (Mordvilko) (*344*), nymph and alata (pl. 5, figs 2, 3) = *Cinara boerneri* Hille Ris Lambers (*348*). Buckton's figure of the 'alate female' is based on an alate male of *boerneri* sent to him by Bignell from Devon.

pinicolus Kaltenbach, *Lachnus* (1881 : 52, pl. 98) = *Cinara boerneri* Hille Ris Lambers (*349a*, *351a*). As with *pini* above, the 'alate female' of *pinicolus* is based on an alate male of *boerneri*.

pisi (Kaltenbach), *Siphonophora* (1876 : 134, pl. 14). There are no specimens so named. Buckton states (p. 135) that the 'glaucous female' (presumably the aptera) figured on plate 14 was taken on *Urtica dioica*; it is therefore likely to be *Microlophium carnosum* (Buckton) (cf. *511*). The alata is probably *Acyrthosiphon pisum* (Harris).

platani (Kaltenbach), *Tinocallis:* slide *161* contains an alata from Italy remounted by Laing from a slide of Richter's, Montpellier.

platanoides (Schrank), *Drepanosiphum* (1876 : 183, pl. 36) = *Drepanosiphum platanoidis* (Schrank) (*111*, *355–357*).

populeus (Kaltenbach), *Chaitophorus* (1879 : 137, pl. 81) = *Chaitophorus versicolor* Koch (*360*, *361*).

populi (L.), *Chaitophorus* (1879 : 140, pl. 82) ? = *Chaitophorus versicolor* Koch (*362*).

pruni Réaumur, *Aphis* (1879 : 64, pl. 56): apterous viviparous female (not figured) probably = *Rhopalosiphum insertum* (Walker), nymph (fig. 1) = *Brachycaudus helichrysi* (Kaltenbach) (*366*), alate viviparous female (fig. 2) = *Dysaphis* (*Pomaphis*) *plantaginea* (Passerini) (*369*), alate male (fig. 3) and ovipara (fig. 4) = *R. insertum* (*367*).

pruni (F.), *Hyalopterus* (1879 : 110, pl. 75) = *Hyalopterus pruni* (Geoffroy) (*44*).

pyraria Passerini, *Aphis* (1879 : 53, pl. 52) = *Longiunguis pyrarius* (Passerini) (*372*, *374*).

pyri Boyer de Fonscolombe, *Aphis* (1879 : 97, pl. 69) = *Dysaphis devecta* (Walker) (*304*, *305*). (See *oxyacanthae* Koch, above.)

pyricola (Baker & Davidson), *Schizoneura*. Among Buckton's material named *Schizoneura ulmi* are three alatae from elm leaf-galls at Maldon, Essex, which appear to be *pyricola* (*541*, *541a*). Buckton notes that they are smaller than alate *ulmi*

and that the galls are formed by the elm leaves becoming 'rolled upwards'. The specimens, which are poorly preserved, have only 14–15 secondary rhinaria on antennal segment III and apparently 4 caudal hairs. There are unpublished sketches of the wings, but not the gall.

querceus (Kaltenbach), *Callipterus* (1881 : 24, pl. 91) = *Tuberculoides annulatus* (Hartig) (*381*, *382*).

quercus (Kaltenbach), *Callipterus* (1881 : 21, pl. 90) = *Tuberculoides annulatus* (Hartig) (*377–379*, *381*).

quercus (Réaumur), *Stomaphis* (1881 : 62, pl. 101) = *Stomaphis quercus* (L.) (*376*).

ranunculina (Walker), *Tubaphis*, receives no mention in the monograph although two slides (*387*, *388*) contain apterae and larvae. Both are labelled *Siphonophora ranunculi* by Buckton and *387* is marked 'Aberdeen. Sept. 1887.'

ribis (L.), *Myzus* (1876 : 180, pl. 34): aptera (fig. 1) and nymph (fig. 2) ? = *Cryptomyzus ribis* (L.), alata (fig. 3) = *Nasonovia ribisnigri* (Mosley). Identifications are deduced from original sketches, to which no extant specimens can be related.

ribis (L.), *Rhopalosiphum* (1879 : 9, pl. 39) = *Hyperomyzus lactucae* (L.) (*391–393*).

roboris (L.), *Dryobius* (1881 : 71, pl. 103) = *Lachnus roboris* (L.) (*394–397*). Buckton's account is based on material sent by Lichtenstein.

rosae (Réaumur), *Siphonophora* (1876 : 103, pls 1, 2, 4) = *Macrosiphum rosae* (L.) (*399*, *401–403*, *405*). Figures 2 and 4, plate 1, appear to have been drawn from a larva and an ovipara, respectively, of *Myzaphis rosarum* (Kaltenbach) (*404*, *407*). The specimens identified as *rosae* which Buckton records (1883 : 180) having received from roses at Kaladhungi in the former North West Frontier Province of India are apterae and larvae of *Macrosiphum* (*Sitobion*) *rosaeformis* Das (*406*).

rosarum (Walker), *Siphonophora* (1876 : 150, pl. 22 bis) = *Chaetosiphon* (*Pentatrichopus*) *tetrarhodus* (Walker) (*408*, *409*).

rubi (Kaltenbach), *Siphonophora* (1876 : 140, pls 17, 18) = *Amphorophora rubi* (Kaltenbach) (*412–414*, *418*). Buckton's reference (p. 141) to *rubi* on *Sarothamnus scoparius* probably relates to specimens of *Acyrthosiphon pisum* (Harris) (*410*).

rubra Lichtenstein, *Tetraneura* (referred to (1881 : 131) but not described) ? = *Tetraneura caerulescens* (Passerini) (*420*, *421*: alatae from red hairy galls on *Ulmus*, Montpellier, September, very poorly preserved).

rumicis L. *Aphis* (1879 : 81 pls 63, 64) = *Aphis fabae* Scopoli (*423*, *424*).

saliceti Kaltenbach, *Aphis* (1879 : 52, pl. 51 bis): aptera (figs 1, 2) = *Aphis farinosa* Gmelin (*428*), alata (fig. 3) = *Cavariella theobaldi* (Gillette & Bragg) (*427*, *428*).

salicis (L.), *Melanoxanthus* (1879 : 21, pl. 42) = *Pterocomma salicis* (L.) (*429–433*).

salicivorus (Walker), *Chaitophorus* (1879 : 134, pl. 80) = *Chaitophorus capreae* (Mosley) (*434*, *435*).

sambucaria, Passerini, *Aphis* (1879 : 95, pl. 68): alate male (fig. 7) = *Rhopalosiphum padi* (L.) (*443*, *445*), ovipara (fig. 6) = *Aphis sambuci* L. (*443–445*). Buckton had no specimens of the apterous and alate viviparae and quotes Passerini's descriptions of these morphs.

sambuci L., *Aphis* (1879 : 99, pl. 70) = *Aphis sambuci* L. (*446*).

sanborni (Gillette), *Macrosiphoniella*. Some specimens from Calcutta, unnamed and without other data, have been remounted by Laing on *103*.

scabiosae Kaltenbach, *Aphis* (1879 : 55, pl. 53): aptera (figs 2, 3) and nymph (fig. 1) = *Aphis gossypii* Glover (*139*), alata (fig. 4) = *Aphis confusa* Walker (*510*). Buckton's notes refer to the specimens he used to illustrate the aptera and nymph of *scabiosae* as 'melon aphis'. What appear to be these specimens are mounted on the same slide (*139*) as the type of *cucurbiti* Buckton (= *gossypii* Glover).

scabiosae (Schrank), *Siphonophora* (1876 : 112, pl. 4 bis) = *Macrosiphum rosae* (L.) (*448*, *450*).

sedi Kaltenbach, *Aphis* (1879 : 90, pl. 66) = *Aphis sedi* Kaltenbach (*452*).

serrulatus Haliday, *Atheroides:* Laing (Laing, 1920 : 39) noted the presence of this species in the Buckton Collection, though Buckton published no description of it. The slide (*454*), labelled *Atheroides serrulatus* by Buckton but with no other data, contains two apterae.

setariae Passerini, *Tychea* (1883 : 88, pl. 128): fundatrix (figs 1, 2, 2a) = *Geoica setulosa* (Passerini) apterous viviparous female on *457*, fundatrigenia (figs 3, 3a) = *Geoica eragrostidis* (Passerini) (*456*), 'matured individual' (figs 4, 4a, 4b) = *Forda formicaria* von Heyden (*457a*).

setulosa Passerini, *Tychea* (1883 : 87, pl. 127): viviparous female (figs 5, 6) = *Geoica eragrostidis* (Passerini) (*458*, *531*), 'variety' (fig. 7) = *Anoecia ?corni* (F.) group (*531*).

solidaginis (F.), *Siphonophora* (1876 : 156, pl. 25) = *Dactynotus* (*Uromelan*) *solidaginis* (F.) (*461*).

sonchi (L.), *Siphonophora* (1876 : 161, pl. 28) = *Dactynotus jaceicola* Hille Ris Lambers (*463*). Details of head and abdominal apex (figs 3, 4) have been drawn from an alate *D.* (*U.*) *taraxaci* (Kaltenbach) (*462*).

sorbi Kaltenbach, *Aphis* (1879 : 58, pl. 54) = *Rhopalosiphum padi* (L.) (*464*, *465*).

spirothecae Koch [sic], *Pemphigus* (1881 : 122, pls 111, 112): the aptera on pl. 111 (fig. 8) is unidentifiable with any extant specimen. The gall (pl. 111, fig. 9) is possibly the work of *P. immunis* Buckton, drawn from one sent by Lichtenstein; the galls on plate 112 (figs 1–3) are of *P. spirothecae* Passerini, also from Lichtenstein. The sexuales (pl. 112, figs 4–6) are unidentifiable with extant specimens. The originals of these figures are missing.

stellariae (Hardy), *Brachycolus* (1879 : 147, pl. 85). The only extant material named *stellariae* is *Holcaphis holci* Hille Ris Lambers (*468*, *469*) sent by Hardy from Wooler, Northumberland. Both Buckton and Hardy believed *stellariae* and *holci* (Hardy, *nomen nudum*) to be the same insect, which in summer migrated from *Stellaria* to *Holcus*.

subterranea Walker, *Aphis* (1879 : 38, pl. 47; 1883 : 105, pl. 130): aptera (pl. 47, fig. 5) = *Aphis sambuci* L. larva (*475*), alata (pl. 130, fig. 2) = *Anuraphis subterranea* (Walker) (*472–474*).

tanaceti (L.), *Siphonophora* (1876 : 151, pl. 23): aptera (fig. 1) = *Metopeurum fuscoviride* Stroyan (*476*), alata (fig. 2) = *Dactynotus* sp. indet. (not identifiable with a specimen).

tanaceticola (Kaltenbach), *Siphonophora* (1876 : 159, pl. 27) ? = *Dactynotus tanaceti* (L.) (*477*).

tanacetina Walker, *Aphis* (1879 : 63) = *Brachycaudus helichrysi* (Kaltenbach)

(*478*, *479*). There are no published figures of *tanacetina*, but a sheet of coloured sketches of larva, nymphs and alata with accompanying notes agree with the specimens and the data of the two slides.

tiliae (L.), *Pterocallis* (1881 : 34, pl. 93) = *Eucallipterus tiliae* (L.) (*486–488*). The description and figure of the 'apterous viviparous female' appear to have been based on an ovipara on *486*.

trirhoda (Walker), *Hyalopterus* (1879 : 114, pl. 77) = *Longicaudus trirhodus* (Walker) (*490*, *491*).

trivialis Passerini, *Tychea* (1883 : 86, pl. 127): ovipara (fig. 3) = *Geoica eragrostidis* (Passerini) apterous viviparous female (*531*), larva (fig. 4) = *Anoecia ?corni* (F.) group (*531*).

troglodytes von Heyden, *Trama* (1881 : 68, pl. 102) = mixture of *Trama troglodytes* von Heyden and *Neotrama caudata* (del Guercio) (*385*, *386*).

tussilaginis (Walker), *Siphonophora* (1876 : 159, pl. 27) = *Dactynotus tussilaginis* (Walker) (*496*).

ulicis Walker, *Aphis*. Buckton (1879 : 84) regards *ulicis* as a 'variation' of *rumicis* L. (= *fabae* Scopoli). His apterae from furze on *498* are *ulicis* Walker.

ulmi (L.), *Schizoneura* (1881 : 97, pls 108, 109) = *Schizoneura ulmi* (L.) (*504*, *506*).

ulmi DeGeer, *Tetraneura* (1881 : 131, pl. 114) = *Tetraneura ulmi* (L.) (*499*, *500*, *502*, *503*). The ovipara (fig. 8) is drawn from a specimen probably sent to Buckton by Kessler from Kassel (*499*). The larva (fig. 10), bred from a migrant captured in flight, is one of several (*501*) which I believe to be *Prociphilus bumeliae* (Schrank) (cf. Mordvilko, 1935; 84, fig. 17). Unfortunately the parent migrant has not been preserved.

urticae (Kaltenbach), *Siphonophora* (1876 : 143, pl. 19) = *Microlophium carnosum* (Buckton) (*511*, *512*).

urticaria Kaltenbach, *Aphis* (1879 : 50, pl. 51): apterous and alate viviparous females (figs 1, 4) = *Aphis urticata* F. (*509*, *W.1040*), nymph (fig. 3, from gooseberry according to MS notes) probably = *Aphis grossulariae* Kaltenbach (unidentifiable with a specimen).

viburni Schrank, *Aphis* (1879 : 77, pl. 61): apterous viviparous female (fig. 1) = *Aphis viburni* Scopoli (*515*), nymph (fig. 2) and alata (fig. 3) = *Ceruraphis eriophori* (Walker) (*516*, *517*), alate male (fig. 4) = *Aphis fabae* Scopoli alate female (*422*), ovipara (fig. 5) = *Aphis fabae* Scopoli ovipara (*425*).

viminalis (Boyer de Fonscolombe), *Lachnus* (1881 : 53, pl. 99) = *Tuberolachnus salignus* (Gmelin) (*439–422*).

xylostei (Schrank), *Siphocoryne* (1879 : 25, pl. 44) = *Hyadaphis foeniculi* (Passerini) (*524*).

BIBLIOGRAPHY

BAKER, A. C. 1917. Eastern aphids, new or little known. *J. econ. Ent.* **10** : 420–433.

—— 1920. Control of Aphids injurious to orchard fruits. Currant, Gooseberry and Grape. *Fmrs' Bull. U.S. Dep. Agric.* **1128** : 1–48.

BALACHOWSKY, A. & CAIRASCHI, A. 1941. Deux Aphides nouveaux récoltés dans l'île de Port Cros (Var). *Bull. Soc. ent. Fr.* **46** : 99–104.

Basu, A. N. & Hille Ris Lambers, D. 1968. One new genus and three new species of Indian aphids (Homoptera, Aphididae). *Ent. Ber., Amst.* **28** : 7–14.
Bignell, G. C. 1898. Notes on Aphides. *Entomologists' mon. Mag.* **34** : 6.
Blanchard, E. E. 1922. Aphid Notes. *Physis B. Aires* **5** : 184–214.
Börner, C. 1920. Wanderungen der Johannisbeer- und Kirschen-blattläuse. *Mitt. biol. Reichsanst. Ld- u. Forstw.* **18** : 119–120.
—— 1926. Züchtung der Homopteren. *In* Abderhalden, *Handb. biol. ArbMeth.*, Abt. **9,** 1(2) : 215–270. Berlin.
—— 1930. Beiträge zu einem neuen System der Blattläuse. *Arch. klassif. phylogen. Ent.* **1** : 115–180.
—— 1938. *Cryptomyzus korschelti* n. sp. Die Blattlaus der Alpenjohannisbeere. *Z. PflKrankh. PflPath. PflSchutz.* **48** : 472–480.
—— 1940. *Neue Blattläuse aus Mitteleuropa.* (Self-published). Naumburg, 4 pp.
—— 1942. Weitere neue europäische Blattlausarten. *Veröff. dt. Kolon. u. Ubersee-Mus. Bremen* **3** : 259–266, 273–276.
—— 1949. Kleine Beiträge zur Monographie der europäischen Blattläuse. *Beitr. tax. Zool.* **1** : 44–62.
—— 1952/53. Europae Centralis Aphides. *Mitt. thüring. bot. Ges.* **3** : 1–488. (Vol. 1, pp. 1–259; Vol. 2, pp. 265–484 (1952), pp. 485–488 (1953).)
—— & Heinze, K. 1957. Tierische Schädlinge und Nutzpflanzen, 2. Homoptera 2. *In* Sorauer, *Handb. PflKrankh.* **5** : 1–576. Berlin.
—— & Schilder, F. A. 1932. Aphidina. *In* Sorauer, *Handb. PflKrankh.* **5** (2) : 551–715. Berlin.
Boyer de Fonscolombe, M. 1841. Descriptions des pucerons qui se trouvent aux environs d'Aix. *Annls Soc. ent. Fr.* **10** : 157–198.
Braun, R. 1938. Die Honigtaufrage und die honigtauliefernden Kienläuse (Cinarini C. B.). *Z. angew. Ent.* **24** : 461–510.
Buckton, G. B. 1876. *Monograph of the British Aphides* **1** : iii+193 pp. Ray Society, London.
—— 1879. *Ibid.* **2** : 175 pp.
—— 1881. *Ibid.* **3** : ii + 142 pp.
—— 1883. *Ibid.* **4** : ix + 228 pp.
—— 1886. Notes on the occurrence in Britain of some undescribed Aphides. *Trans. ent. Soc. Lond.* **1886** : 323–328.
—— 1889*a*. *In* Atkinson, E. T. Notes on Indian insect pests. Rhynchota. *Indian Mus. Notes* **1** (1) : 6.
—— 1889*b*. Gall-insects. *Trans. Linn. Soc. Lond.* (2) **5** : 141–142.
—— 1891*a*. Ceylon Tea Aphid. *Indian Mus. Notes* **2** (1) : 34–35.
—— 1891*b*. Baluchistan Fruit Tree Aphid. *Indian Mus. Notes* **2** (1) : 40–41.
—— 1893*a*. A new gall-making aphid. *Indian Mus. Notes* **3** (1) : 71–73.
—— 1893*b*. Notes on Indian Aphides. *Indian Mus. Notes* **3** (2) : 87–88.
—— 1893*c*. Notes on Indian Aphidae. *Indian Mus. Notes* **3** (3) : 108–109.
—— 1896. Note on two new species of gall-aphids from the north-western Himalayan Region. *Indian Mus. Notes* **4** (2) : 50–51.
—— 1899*a*. The Pear-tree Aphis, *Lachnus pyri* Buckton. *Indian Mus. Notes* **4** (5) : 274–276.
—— 1899*b*. Notes on two new species of Aphids. *Indian Mus. Notes* **4** (5) : 277–278.
—— 1901. Aphides in ants' nests. *Sci. Gossip* (N.S.) **7** : 257.
Burmeister, H. 1835. *Handbuch der Entomologie* **2** : 85–95. Berlin.
Carter, C. I. 1971. Conifer Woolly Aphids (Adelgidae) in Britain. *Bull. For. Commn, Lond.* **42** : 1–51.
Cholodkovsky, N. 1897. Beiträge zu einer Monographie der Coniferen-Läuse I. *Trudy russk. ent. Obshch.* **30** : 1–102.
Courchet, L. 1879. *Étude sur les galles produites par les Aphidiens.* Faculté de Pharmacie, Montpellier. 106 pp.
Das, B. 1918. The Aphididae of Lahore. *Mem. Indian Mus.* **6** : 135–274.

DAVATCHI, A. G. 1958. Étude biologique de la Faune entomologique des Pistacia sauvages et cultivés. *Revue Path. vég. Ent. agric. Fr.* **37** : 1–166.
DAVIS, J. J. 1911. List of the Aphididae of Illinois, with notes on some of the species. *J. econ. Ent.* **4** : 325–331.
—— 1914*a*. New or little-known species of Aphididae. *Can. Ent.* **46** : 121–134.
—— 1914*b*. The yellow clover aphis. *Tech. Ser. Bur. Ent. U.S.* **25** : 17–40.
DICKSON, R. C. 1959. On the identity of the Spotted Alfalfa Aphid in North America. *Ann. ent. Soc. Am.* **52** : 63–68.
——, LAIRD, E. F. & PESHO, G. R. 1955. The Spotted Alfalfa Aphid (Yellow Clover Aphid on Alfalfa). *Hilgardia* **24** : 93–118.
DONCASTER, J. P. 1961. *Francis Walker's Aphids.* British Museum (Nat. Hist.), London, viii + 165 pp.
—— 1966. Notes on some Indian aphids described by G. B. Buckton. *Entomologist* **99** : 157–160.
—— 1969. Some species of *Pemphigus* (Homoptera, Aphididae), described from the Indian region by G. B. Buckton. *Proc. R. ent. Soc. Lond.* (B) **38** : 157–164.
DONISTHORPE, H. ST. J. K. 1902. Notes on the British myrmicophilous fauna (excluding Coleoptera). *Entomologist's Rec. J. Var.* **14** : 37–40.
—— 1927. *The Guests of British Ants, their habits and life-histories.* London, Routledge, xxiii + 244 pp.
EASTOP, V. F. 1966. A taxonomic study of Australian Aphidoidea (Homoptera). *Aust. J. Zool.* **14** : 399–592.
ESSIG, E. O. 1917. Aphididae of California. *Univ. Calif. Publs Ent.* **1** : 301–346.
—— 1938. Aphids feeding on celery in California. The Lily Aphid. *Hilgardia* **11** : 476–478.
FABRICIUS, J. C. 1775. *Systema Entomologiae:* 733–742. Flensburgi & Lipsiae.
—— 1781. *Species Insectorum . . .* **2** : 517 pp. [Aphids pp. 384–390]. Hamburg & Kiel.
FERRARI, P. M. 1872*a*. Aphididae Liguriae. *Annali Mus. civ. Stor. nat. Giacomo Doria* **2** : 49–85.
—— 1872*b*. Species Aphididarum hucusque in Liguria lectos. *Annali Mus. civ. Stor. nat. Giacomo Doria* **3** : 209–236.
FITCH, A. 1855. First report on the noxious, beneficial and other insects of the State of New York. *Trans. N.Y. St. agric. Soc.* **14** : 705–880.
—— 1856. Third report on noxious and other insects of the State of New York. *Trans. N.Y. St. agric. Soc.* **16** : 315–477.
FULLAWAY, D. T. 1909. Report of the Entomologist. Synopsis of Hawaiian Aphididae. *Rep. Hawaii. agric. Exp. Stn* : 17–46.
GEORGE, C. J. 1928. South Indian Aphididae. *J. Proc. Asiat. Soc. Beng.* **23** : 1–12.
GHOSH, A. K., & RAYCHAUDHURI, D. N. 1968. Aphids (Insecta, Hemiptera) of Sikkim. *Proc. zool. Soc. Calcutta* **21** : 179–195.
GHULAMULLAH. 1941. Aphididae and some other Rhynchota from Afghanistan. *Indian J. Ent.* **3** : 225–238.
GILLETTE, C. P. 1908. New species of Colorado Aphididae, with notes upon their life-habits. *Can. Ent.* **40** : 17–20.
—— & PALMER, M. A. 1924. New Colorado Lachnini. *Ann. ent. Soc. Am.* **17** : 1–44.
—— & —— 1931. The Aphididae of Colorado I. *Ann. ent. Soc. Am.* **24** : 827–934.
—— & —— 1934. The Aphididae of Colorado III. *Ann. ent. Soc. Am.* **27** : 133–255.
GMELIN, J. F. 1790. *Caroli a Linné . . . Systema Naturae.* Ed. XIII, aucta, reformata. (1788–1793). Tom. I [1790] pars IV : Aphis 2201–2211. Lipsiae.
GOEZE, J. A. E. 1778. *Entomologische Beyträge zu des Ritters Linné zwölften Ausgabe des Natursystems* **2** : 286–318. Leipzig.
GOOT, P. VAN DER, 1912. Über einige noch nicht oder nur unvollständig beschriebene Blattlausarten. *Tijdschr. Ent.* **55** : 58–96.
—— 1915. *Beiträge zur Kenntnis der Holländischen Blattläuse.* Haarlem & Berlin. 600 pp., 8 pl.
—— 1917. Zur Kenntnis der Blattläuse Java's. *Contrib. Faune Indes Néerlandaises* **3** : 1–301.

GUERCIO, G. DEL, 1900. Prospetto dell'Afidofauna Italica. *Nuove Relaz. R. Staz. Ent. agr.* **2** : 1–236.
—— 1909. Contribuzione alla conoscenza dei Lacnidi Italiani. *Redia* **5** : iii–iv, 173–359.
—— 1911. Intorno ad alcuni Afidi della Penisola Iberica e di altre località, raccolti dal Prof. J. S. Tavares. *Redia* **7** : 296–333.
—— 1917. Contribuzione alla conoscenza degli Afidi. *Redia* **12** : 197–277.
HALL, W. J. 1926. Notes on the Aphididae of Egypt. *Bull. Minist. Agric. Egypt tech. scient. Serv.* **68** : viii + 62 pp.
HARTIG, T. 1841. Versuch einer Eintheilung der Pflanzenläuse (*Phytophthires* Burm.) nach der Flügelbildung. *Z. Ent.* (Germar) **3** : 359–376.
HEIE, O. 1960. A list of Danish aphids, 1. *Ent. Meddr* **29** : 193–211.
——1969. A list of Danish aphids, 7. *Ent. Meddr* **37** : 373–385.
HENRICH, C. 1910. Die Blattläuse Aphididae der Umgebung von Hermannstadt. *Verh. Mitt. siebenb. Ver. Naturw.* **59** : 1–104.
HEYDEN, C. H. G. VON, 1837. Entomologische Beiträge. Hemipt. Aphid. *Mus. senckenb.* **2** : 289–299.
HILLE RIS LAMBERS, D. 1931*a*. Contribution to the knowledge of the Aphididae (Hom.) I. *Tijdschr. Ent.* **74** : 169–183.
—— 1931*b*. Notes on the Aphididae of Venezia Tridentina, with descriptions of new species. I. *Memorie Mus. Stor. nat. Venezia trident.* **1** (1–2) : 11 pp.
—— 1933. Notes on Theobald's "The Plantlice or Aphididae of Great Britain". *Stylops* **2** : 169–176.
—— 1934. Notes on Theobald's "The Plantlice or Aphididae of Great Britain" II & III. *Stylops* **3** : 25–33.
—— 1938. Contributions to a monograph of the Aphididae of Europe. I. *Temminckia* **3** : 1–44.
—— 1939. Contributions to a monograph of the Aphididae of Europe. II. *Ibid.* **4** : 1–134.
—— 1945. De Bloedvlekkenluis van Appel. *Tijdschr. PlZiekt.* **51** : 57–69.
—— 1947. Contributions to a monograph of the Aphididae of Europe. III. *Temminckia* **7** : 179–319.
—— 1948. On Palestine Aphids. *Trans. R. ent. Soc. Lond.* **99** : 269–289.
—— 1949. Contributions to a monograph of the Aphididae of Europe. IV. *Temminckia* **8** : 182–323.
—— 1950. Neue Blattläuse aus der Schweiz (III). *Mitt. schweiz. ent. Ges.* **23** (1) : 37–46.
—— 1953. Contributions to a monograph of the Aphididae of Europe. V. *Temminckia* **9** : 1–176.
—— 1955. Two new species of *Sappaphis* Mats. (Homopt., Aphid.). *Ent. Ber., Amst.* **15** : 304–309.
—— & BASU, A. N. 1966. Some new or little known genera, subgenera, species and subspecies of Aphididae from India. *Ent. Ber., Amst.* **26** : 12–36.
—— & VAN DEN BOSCH, R. 1964. On the genus *Therioaphis* Walker, 1870, with descriptions of new species (Homoptera, Aphididae). *Zool. Verh., Leiden* **68** : 1–47.
HORI, M. 1929. Studies of the noteworthy species of plant lice in Hokkaido. *Rep. Hokkaido natn. agric. Exp. Stn* **23** : 1–163.
HOTTES, F. C. 1930. Aphid homonyms. *Proc. biol. Soc. Wash.* **43** : 179–184.
—— 1949. Notes on a little known work by Ph. F. Gmelin published in 1758 wherein he describes some new species of Aphis. *Pan-Pacif. Ent.* **25** : 83–87.
—— & BRADLEY, G. A. 1953. Two new species of *Cinara* (Homoptera, Aphididae) from Ontario. *Proc. biol. Soc. Wash.* **66** : 85–88.
—— & ESSIG, E. O. 1953. Descriptions of new species of *Cinara* from western United States. *Proc. biol. Soc. Wash.* **66** : 159–172.
—— & FRISON, T. H. 1931. The Plant Lice or Aphididae of Illinois. *Bull. Ill. nat. Hist. Surv.* **19** (3) : 121–447.

Jacob, F. H. 1946. A new British species of *Myzaphis* van der Goot associated with wild roses, *Myzaphis bucktoni* sp. n.; and a comparison with *M. rosarum* (Kalt.) (Hem., Aphid.). *Proc. R. ent. Soc. Lond.* (B) **14** : 102–110.

Judenko, E. 1930. Data concerning the fauna and the biology of plant lice (Aphididae) from the surroundings of Pulawy. *Polskie Pismo ent.* **9** : 129–186.

Kaltenbach, J. H. 1843. *Monographie der Familien der Pflanzenläuse.* (*Phytophthires*). Aachen. xliii + 222 pp.

—— 1856. Die Deutschen Phytophagen aus der Klasse der Insekten. *Verh. naturh. Ver. preuss. Rheinl.* **13** : 236.

Kessler, H. F. 1881. Die auf *Populus nigra* L. und *Populus dilatata* Ait. vorkommenden Aphiden-Arten und die von denselben bewirkten Missbildungen. *Abh. Ber. Ver. Naturk. Cassel* **28** : 36–76.

Kirby, W. F. 1907. George Bowdler Buckton, 1818–1905. *Proc. R. Soc.* B. **79** : xlv–xlviii.

Kloet, G. S. & Hincks, W. D. 1945. *A Check List of British Insects.* Stockport. lix + 483 pp.

—— & —— 1964. *A Check List of British Insects.* 2nd Ed. Part 1. London. xv + 119 pp.

Knechtel, W. K. & Manolache, C. I. 1940. Neue Blattlausarten für Rumanien. *Bull. Sect. scient. Acad. roum.* **23** : 162–171.

—— & —— 1945. Neue Blattläuse für Rumanien. *Bull. Sect. scient. Acad. roum.* **27** : 475–485.

Knowlton, G. F. 1929. Notes on a few species of Myzini from Utah with descriptions of two new species. *Can. Ent.* **61** : 9–15.

Koch, C. L. 1854–1857. *Die Pflanzenläuse Aphiden.* Nürnberg. 1. pp. 1–134, 1854. 2. pp. 135–236, 1855. 3. pp. 237–334 & plates, 1856. Index, 1857.

Laing, F. 1919. Two species of British Aphides. *Entomologist's mon. Mag.* **55** : 272–274.

—— 1920. On the genus *Atheroides* Haliday. *Ibid.* **56** : 38–45.

—— 1923. Aphidological Notes (Hemiptera-Homoptera). *Ibid.* **59** : 238–247.

Leonard, M. D. 1963. The distribution and habits of the Mint Aphid *Ovatus crataegarius* (Walker). *Proc. ent. Soc. Wash.* **65** : 55–62.

Lichtenstein, W. A. J. 1885. *Les Pucerons. Monographie des Aphidiens.* Pt. 1. pp. 1–185, 4 plates. Montpellier.

—— 1886. *Monographie des Pucerons du Peuplier.* pp. 1–42. Montpellier.

Lindinger, L. 1912. *Die Schildläuse* (*Coccidae*). Stuttgart, Eugen Ulmer, 388 pp.

—— 1932. Literaturstudie über einige Blattlausgallen (Aphid). *Ent. Z., Frankf. a. M.* **45** (20) : 273–279.

Linnaeus, C. 1746. *Fauna Svecica, sistens Animalia Sveciae Regni Quadrupedia, Aves. Amphibia, Pisces, Insecta, Vermes. Distributa per Classes et Ordines, Genera et Species.* Lugd. Batav. [Aphis, Chermes : 214–218.]

—— 1758. *Systema Naturae*, ed. 10, vol. **1**, 823 + 1 p. emendanda & addenda. Holmiae.

—— 1767. *Idem.*, ed. 12, pp. 733–739. Holmiae.

Macchiati, L. 1885. Flora degli Afidi dei dintorni di Cuneo, colla descrizione di alcune specie nuove. *Boll. Soc. ent. ital.* **17** : 51–70.

Mamet, J. R. 1967. A few species of Aphididae (Homoptera) new to the fauna of the Islands of Réunion and Mauritius. *Bull. Maurit. Inst.* **6** (2) : 63.

Mason, P. W. 1925. A revision of the insects of the Aphid Genus *Amphorophora. Proc. U.S. natn. Mus.* **67** (20) : 1–92.

—— 1927. Fauna sumatrensis Aphiidae. *Supplta ent.* **15** : 86–90.

Matsumura, S. 1918. New Aphidinae of Japan. *Trans Sapporo nat. Hist. Soc.* **7** (1) : 1–22.

Mimeur, J. M. 1934. Aphididae du Maroc. *Mém. Soc. Sci. nat. Phys. Maroc* **40** : 1–71.

Miyazaki, M. 1968. A revision of the fern aphids of Japan with descriptions of three new species. *Insecta matsum.* **31** (3) : 13–24.

Monell, J. 1882. Notes on Aphididae. *Can. Ent.* **14** : 13–16.

Monzen, K. 1929. Studies on some gall-producing Aphides and their galls. *Saito Ho-on Kai Monog.* No. **1** : 1–80. Sendai.

MORDVILKO, A. 1894. On the fauna and anatomy of the Family Aphididae of the Basin of the Vistula. *Rab. Lab. zool. Kab. imp. varsch. Univ.* **3** : 1–274.
—— 1909. Über den Ursprung der Erscheinung von Zwischenwirten bei den tierischen Parasiten. *Biol. Zbl.* **29** : 369–381.
—— 1914. *Fauna of Russia and neighbouring countries.* I. Insecta. Hemiptera **1** : 1–236 + 9 pp. addenda. Zool. Mus. Acad. Sci., Petrograd. [In Russian].
—— 1919. *Ibid.* 2. Insecta. Hemiptera **1** (2) : 237–508. Zool. Mus. Acad. Sci., Petrograd. [In Russian].
—— 1929. Food Plant Catalogue of the Aphididae of the U.S.S.R. *Trudȳ prikl. Ent.* **14** : 1–100. [In Russian].
—— 1935. Die Blattläuse mit unvollständigem Generationszyklus und ihre Entstehung. *Ergebn. Fortschr. Zool.* **8** : 36–328.
MORITSU, M. 1948. The Genus *Megoura* Buckton in Japan, with note on the variation of the external characters in *Megoura viciae japonica* (Matsumura). *Mushi* **18** (13) : 83–88.
MOSLEY, O. 1841. Aphides. *Gdnrs' Chron.* **1** : 628, 684, 747–748, 827–828.
MÜLLER, F. P. 1965. Blattläuse (Homoptera: Aphidina) von den Azoren und von Madeira. *Bolm Mus. munic. Funchal* **19** : 5–15.
NEVSKY, V. P. 1929. The plant lice of Central Asia. *Trudȳ uzbekist. opyt. Sta. Zashch. Rast.* **16** : 1–425. [In Russian].
NIETNER, J. 1861. *Observations on the enemies of the Coffee Tree in Ceylon.* Ceylon. 31 pp.
OESTLUND, O. W. 1887. Synopsis of the Aphididae of Minnesota. *Bull. Minn. geol. nat. Hist. Surv.* **4** : 1–100.
—— 1922. A synoptical key to the Aphididae of Minnesota. *Rep. Minn. St. Ent.* **19** : 114–151.
OPMANIS, K. 1928. Ein Beitrag zur Kenntnis der Aphidenfauna Lettlands. *Latv. Univ. Rak.* **18** : 1–154. [Reprint.]
OSSIANNILSSON, F. 1959. Contributions to the knowledge of Swedish aphids. II. *Lantbr-Högsk. Annlr* **25** : 375–527.
PAIK, W. H. 1965. *Aphids of Korea.* Seoul National University, Korea. 160 pp.
PASSERINI, G. 1856. Gli insetti autori delle galle del Terebinto e del Lentisco insieme ad alcuni specie congeneri. *Giornale i Giardini* **3** : 260–264. Mediolani.
—— 1860. *Gli Afidi con un prospetto dei generi ed alcune specie nuove Italiane.* Parma. 40 pp.
—— 1863. Aphididae italicae hucusque observatae. *Archo Zool. Anat. Fisiol.* **2**, fasc. 2 : 129–212.
PATCH, E. M. 1912. Aphid pests of Maine. *Bull. Me agric. Exp. Stn* **202** : 159–178.
—— 1914. Currant and gooseberry aphids in Maine. *Bull. Me agric. Exp. Stn* **225** : 49–60.
PINTERA, A. 1956. Monographische Übersicht der europäischen Zierläuse (Homoptera, Aphidoidea). *Roč. čsl. Spol. ent.* **53** : 115–142.
QUEDNAU, W. 1954. Monographie der mitteleuropäischen Callaphididae, unter besonderer Berücksichtigung des ersten Jugendstadiums. *Mitt. biol. Reichsanst. Ld- u. Forstw.* **78** : 5–53.
RATZEBURG, J. T. C. 1843. Bericht über einige neue, den Waldbäumen schädliche Rhynchoten. *Stettin. ent. Ztg* **3** : 201–202.
RICHARDS, W. R. 1965. The Callaphidini of Canada. *Mem. ent. Soc. Can.* **44** : 1–149.
ROBINSON, A. G. 1966. Review of the Fern Aphids in North America with descriptions of a new species and a new genus. *Can. Ent.* **98** (12) : 1252–1259.
RONDANI, C. 1848. Osservazioni sopra parecchie specie di Esapodi Afidicidi. Familia Hemipterorum, Aphidinae, Mihi. *Nuovi Ann. Sci. nat. Bologna* (2) **9** : 34–37.
SANBORN, C. E. 1904. Kansas Aphididae. *Kans. Univ. Sci. Bull.* **3** : 1–82.
SCHOUTEDEN, H. 1901. Le genre *Siphonophora* C. Koch. *Annls Soc. ent. Belg.* **45** : 111–117.
—— 1902. Aphidologische Notizen. *Zool. Anz.* **25** : 654–657.
—— 1903. Les Aphidocécidies paléarctiques. *Annls Soc. ent. Belg.* **47** : 167–193.
—— 1906*a*. Catalogue des Aphides de Belgique. *Mem. Soc. r. ent. Belg.* **12** : 189–246.
—— 1906*b*. A supplementary list to Kirkaldy's Catalogue of the Aphidae described as new from 1885. *Annls Soc. ent. Belg.* **50** : 30–36.
—— 1906*c*. Un nouvel ennemi du cacaoyer en Afrique. *Annls Soc. ent. Belg.* **50** : 37–39.
SCHRANK, P. VON, 1801. *Fauna Boica* **2** (1) : 1–374. Ingolstadt.

SHAPOSHNIKOV, G. KH. 1964. *In* Bey-Bienko, G. Y., *Classification Keys to the insects of the European part of the U.S.S.R.*, Aphidinea **1** : 489–616. Acad. Sci., Moscow & Leningrad. [In Russian].

SHINJI, G. O. 1922. New genera and species of Japanese Aphididae. *Zool. Mag. Tokyo* **34** : 787–800. [In Japanese].

—— 1933. Three new species of *Amphorophora*. *Zool. Mag. Tokyo* **45** : 347–351. [In Japanese].

—— 1941. *General Study of Japanese Aphids*. 1215 pp. Shukyosha, Tokyo. [In Japanese].

SHIRAKI, T. 1913. Inquiry into harmful insects in general. *Spec. Rep. Formosa agric. Exp. Stn* **8** : 1–670. [In Japanese].

SMITH, C. F., MARTORELL, L. F. & PÉREZ-ESCOLAR, M. E. 1963. Aphididae of Puerto Rico. *Tech. Pap. agric. Exp. Stn P. Rico* **37** : 1–121.

STROYAN, H. L. G. 1955. Recent additions to the British Aphid Fauna. Part II. *Trans. R. ent. Soc. Lond.* **106** : 283–340.

—— 1957*a*. *The British species of Sappaphis Matsumura. Part I. Introduction and Subgenus Sappaphis sensu stricto*. 59 pp. London, H.M.S.O.

—— 1957*b*. Further additions to the British Aphid Fauna. *Trans. R. ent. Soc. Lond.* **109** : 311–360.

—— 1963. *The British species of Dysaphis Börner. Part 2. The Subgenus Dysaphis sensu stricto*. 119 pp. + 7 pp. index (1965). London, H.M.S.O.

SWAIN, A. F. 1918. New Aphididae from California. *Trans. Am. ent. Soc.* **44** : 1–23..

—— 1919. A Synopsis of the Aphididae of California. *Univ. Calif. Publs Ent.* **3** : 1–221.

—— 1921. Miscellaneous Studies in the Family Aphididae (Hem. Hom.). V. Notes on some Lachnids in the British Museum. *Ent. News* **32** : 209–213, 225–229.

SZELEGIEWICZ, H. 1962. Materialy do poznania mszyc (Homoptera, Aphididae) Polski, I. Podrodzina Lachninae. *Fragm. faun.* **10** : 63–98.

—— 1965. Studies on the Tribe Pterocommatini Mordv. (Homoptera, Aphididae). Part I. Phylogeny and Generic Classification. *Annls zool. Warsz.* **23** : 251–301.

TAKAHASHI, R. 1931. Aphididae of Formosa. Part 6. *Rep. Govt Res. Inst. Dep. Agric. Formosa* **53** : 1–127.

—— 1932. Additions to the aphid fauna of Formosa (Hemiptera). *Philipp. J. Sci.* **48** : 69–75.

—— 1933. *Pemphigella aedificator* Buckton produces galls in Formosa (Aphididae, Hemiptera). *Trans. nat. Hist. Soc. Formosa* **23** : 352–353.

—— 1938. Some Aphididae from South China and Hainan (Homoptera). III. *Trans. nat. Hist. Soc. Formosa* **28** : 11–14.

—— 1966. Some Aphididae from Afghanistan (Homoptera). *Results Kyoto University Scientific Expedition to the Karakoram and Hindukush*, 1955, **8** : 263–269.

TAO, C. C. 1962. Revision of Chinese Aphinae. *Plant Protection Bulletin* **4** (3) : 95–110. (Publ. by Plant Protection Society of Republic of China.)

TASHEV, D. 1964. Contribution to the aphid fauna of Bulgaria. *Izv. zool. Inst. Sof.* **16** : 161–164.

THEOBALD, F. V. 1912. The Aphides attacking *Ribes*, with descriptions of two new species. *J. econ. Biol.* **7** : 94–116.

—— 1913. The British species of the genus *Macrosiphum* Passerini. *J. econ. Biol.* **8** : 47–94, 113–154.

—— 1915. African Aphididae. II. *Bull. ent. Res.* **6** : 103–153.

—— 1917. Notes on new and little-known British aphides. III. *Entomologist* **50** : 76–82.

—— 1918. African Aphididae. III. *Bull. ent. Res.* **8** : 273–294.

—— 1919. New and little-known British aphides. V. *Entomologist* **52** : 157–161.

—— 1923. New species of British aphides. *Entomologist's mon. Mag.* (3) **9** : 23–28.

—— 1925. New and little-known British aphides. *Entomologist's mon. Mag.* **61** : 71–81.

—— 1926. *The Plant Lice or Aphididae of Great Britain*. **1**: 327 pp. Headley Bros., Ashford, Kent.

—— 1927. *Ibid.* **2**: 411 pp.

—— 1929. *Ibid.* **3**: 364 pp.

TIMBERLAKE, P. H. 1924. Notes on Hawaiian Aphidae, with a list of food plants. *Proc. Hawaii. ent. Soc.* **5** : 450–460.
TSENG, S. & TAO, C. 1936. A list of the Aphididae of China with descriptions of four new species. *Entomology Phytopath.* **4** : 120–176.
TULLGREN, A. 1909. Aphidologische Studien. I. *Ark. Zool.* **5** (14) : 1–190.
VALLOT, J. J. 1836. Observations sur deux insectes Hémiptères qui vivent, l'un sur le mélèze et l'autre sur le cafier. *C. r. hebd. Séanc. Acad. Sci., Paris* **1836** : 72–73.
VILLERS, C. J. DE, 1789. *C. Linnaei Entomologia Faunae Suecicae.* Editio tertia. Lugduni. *Aphis, Chermes:* 540–558.
WALKER, F. 1848*a*. Descriptions of Aphides. *Ann. Mag. nat. Hist.* (2) **2** : 190–203.
—— 1848*b*. Descriptions of Aphides. *Zoologist* **6** : 2246–2252.
—— 1849*a*. Descriptions of Aphides. *Ann. Mag. nat. Hist.* (2) **3** : 43–53.
—— 1849*b*. Descriptions of Aphides. *Zoologist* **7** : Appendix xxxi–xl, xliii–lvii.
—— 1850. Descriptions of Aphides. *Ann. Mag. nat. Hist.* (2) **5** : 14–28, 269–281, 388–395.
—— 1852. *List of the specimens of Homopterous Insects in the Collections of the British Museum*, Part IV. London. pp. 934–1056.
WILLCOCKS, F. C. 1922. A survey of the more important Economic Insects and Mites in Egypt. *Bull. agric. Soc. Cairo* **1** : 1–482.
—— 1925. The Aphides of Wheat and Barley. In *The Insect and Related Pests of Egypt* **2** : 104–129 Sultanic agric. Soc., Cairo.
WILSON, H. F. & VICKERY, R. A. 1918. A species list of the Aphididae of the world and their recorded food plants. *Trans. Wis. Acad. Sci. Arts Lett.* **19** : 25–355.
WOLCOTT, G. N. 1948. The Insects of Puerto Rico. *J. Agric. Univ. P. Rico* **32** : 146–156.
ZWÖLFER, H. 1957–1958. Zur Systematik, Biologie und Ökologie unterirdisch lebender Aphiden. Part I. Anoeciinae. *Z. angew. Ent.* **40** : 182–221. Part II. Tetraneurini & Pemphigini. *Ibid.* **40** : 528–575. Part III. Fordinae. *Ibid.* **42** : 129–172.

INDEX

1. Genus-group Names

2. Species-group Names

Names in *italics* are synonyms or otherwise invalid. A colon (:) between name and author indicates a misidentification. Page numbers in **bold** type refer to descriptions.